



**SIEMENS**

Description and Tutorial  
for

**SIMOCRANE**  
**Drive-Based Technology V1.0 SP1 HF1**  
**with Sinamics CU 310-2**

Siemens Cranes  
Product Management  
February 2013, Erlangen, Germany

# SIMOCRANE Drive-Based Technology V1.0 SP1 HF1

## Overview

### Siemens Solution for Mid-Performance Crane Application

- A drive-based solution in SINAMICS environment
- Special Sinamics Firmware for Cranes application
- Crane specialized technologies in DCC-blocks
- Preconfigured standard applications (Ready-to-Run)
- Open for customized adaption (Ready-to-Apply)

# MC Cranes

## Our product portfolio

### High Performance

### Mid Performance

SIMOCRANE

#### Crane Technology

#### Crane Management System



(Remote) CMS



CMS Lite

#### Advanced Technology



Sway Control



Skew Control



2D-Trajectory



Truck Position System



ECO Technology

#### Basic Technology



Basic Technology V3.0



Drive-Based Technology

Platform

#### Motion Controller



SIMOTION D435-2

#### Drive Controller



CU320-2



CU310-2

#### Drives



Crane Cabinet Modules



Chassis



Book-size



PM340



PM250

#### Motors



1LA8/  
1LL8



1PH8



1LG4/6



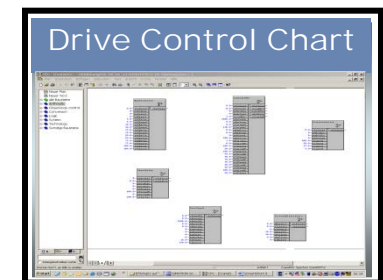
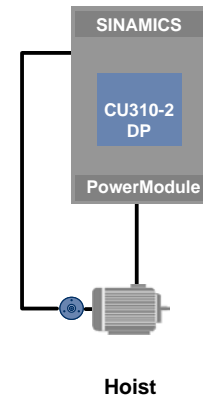
1LP4/6

# Product Introduction

# Functional Scope (1)

## Product Scope

- **Crane midrange solution is**
  - A Sinamics AC/AC Single axis drive (power module),
  - Contol Unit CU310-2,
  - A special Sinamics FW V4.5 for Cranes and
  - Simocrane Drive-Based Technology V1.0 SP1 HF1.
- **This special Firmware can operate**
  - With PM340
  - With PM Chassis
  - With PM250
  - With Safety functions
  - without Servo-Control.
- **Crane technology in DCC-Blocks**
  - Load-dependent field weakening
  - Pre-limit switch (selectable limiting)
  - Start pulse
  - Master switch
  - Over-speed monitoring (not a fail-safe function)
  - Current distribution monitoring (for double Axes)



# Functional Scope (2)

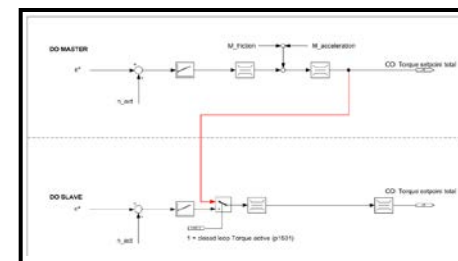
## Product Scope

### Standard applications via I/O-onboard or via Profibus

- Selectable via I/O-onboard or via Profibus
- Selectable with analogue or digital master-switch
- Combination of Startpulse with brake control
- SingleAxis application for Hoist or Trolley or Gantry
- DoubleAxes application for Master-Slave torque control
- Configuration via scripting

### ➤ Sinamics functionality

- Time-optimized positioning for a single axis
- Master-slave closed-loop torque control
- Brake control
- Integrated Safety



- **The Crane DCC-chart is know-how protected, therefore, it can not be opened. The customized DCC application can be made in another DCC-chart under other Drive-Object (e.g. CU).**
- **There is no online-help in Sinamics Starter for user defined parameters.**
- **The grab function and synchronous operation are not parts of this product.**

# Scope of Supply

## Product Scope



### V1.0 SP1 HF1

#### Memory card (CF card)

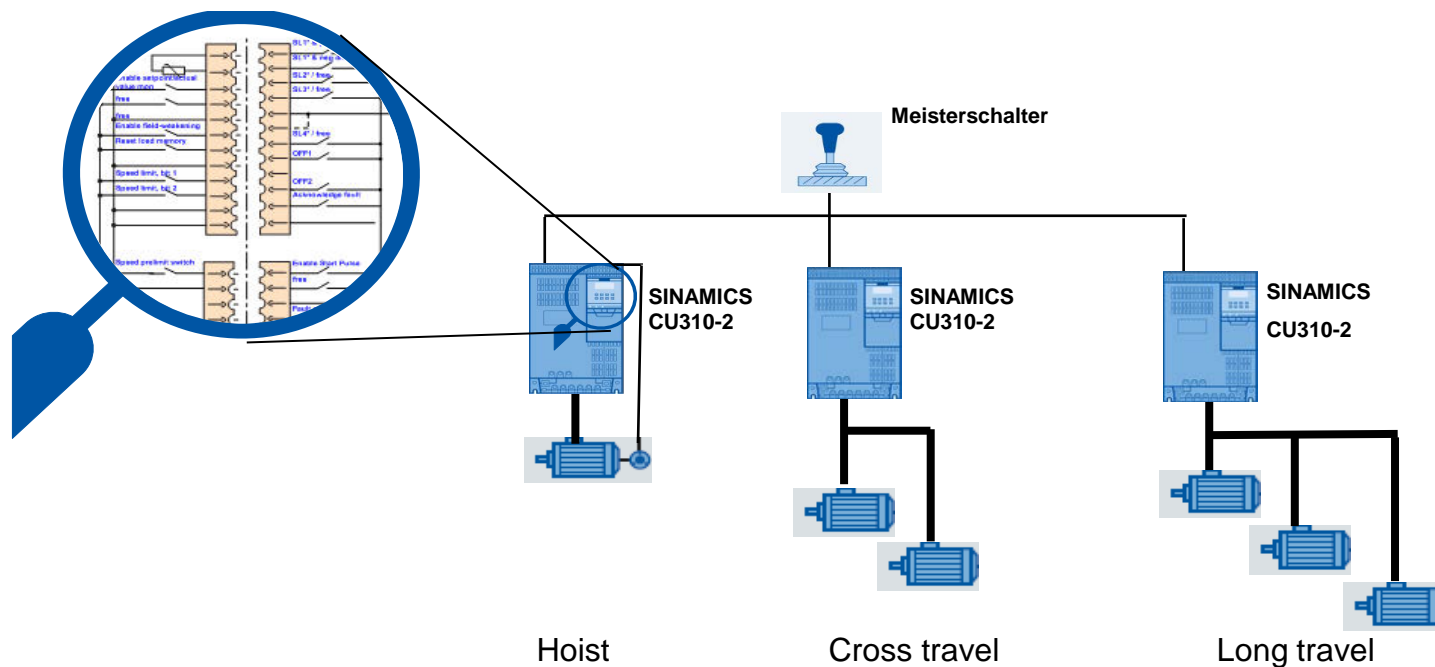
- SINAMICS FW V4.5.1 for Cranes

#### CD with

- Cranes DCC blocks
- Standard applications
- Documentation

# Configuration Example of OHBC with Onboard I/O-signal

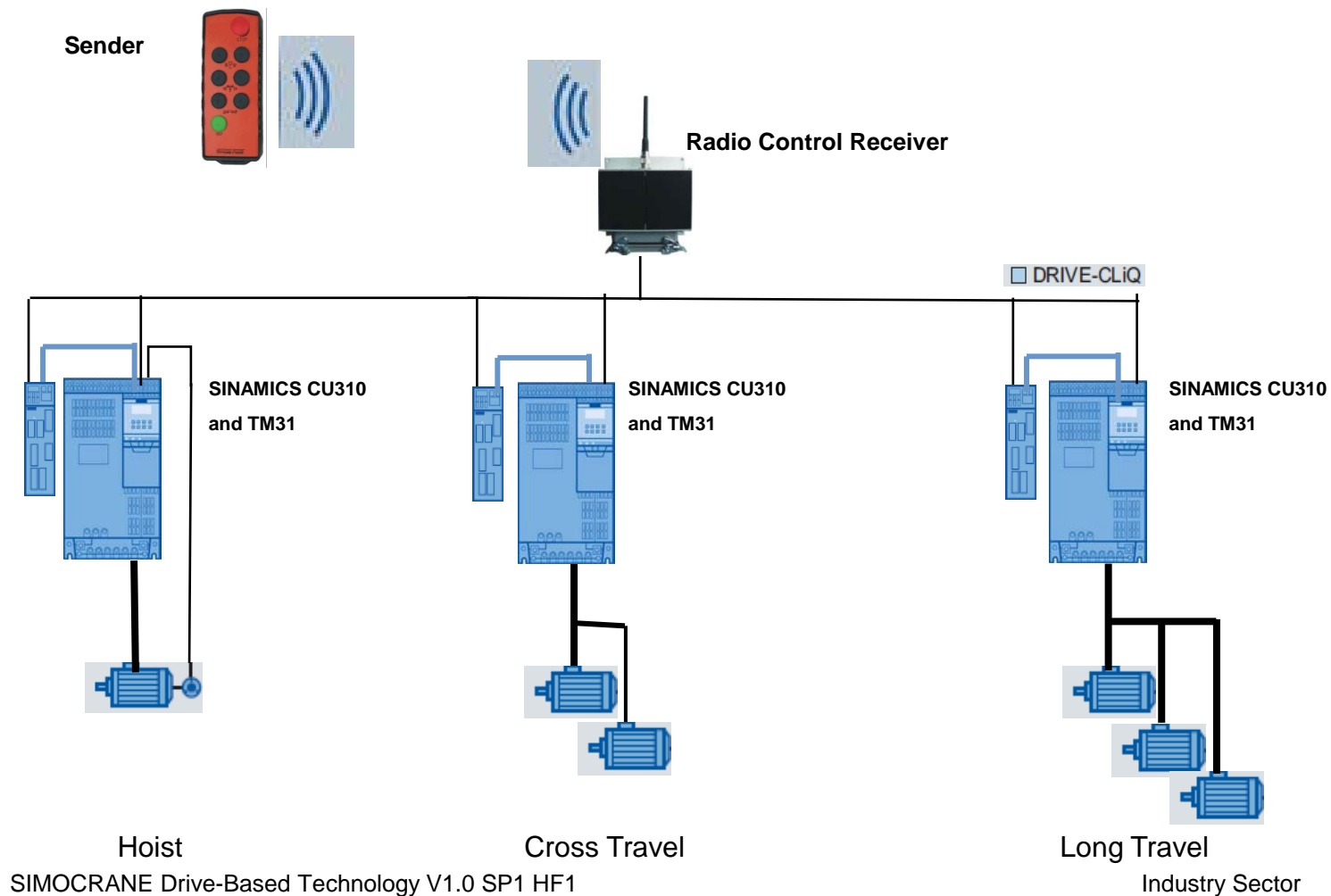
## Product Scope





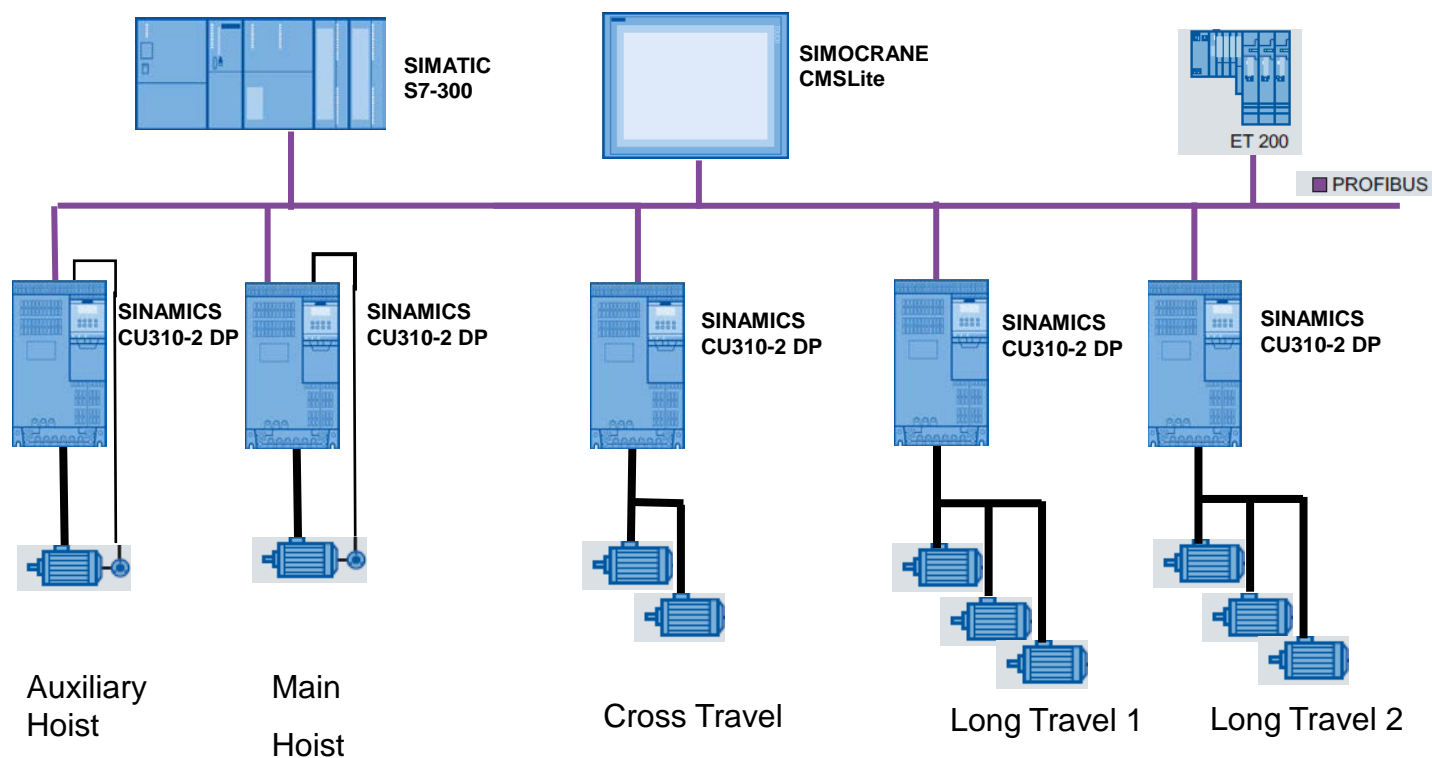
# Configuration Example of OHBC with I/O Terminal Board Control

## Product Scope



# Configuration Example of OHBC with Simatic Control via Profibus

## Product Scope



# **Commissioning Guideline**

# Commissioning Guideline

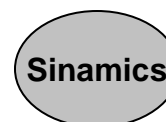


Sinamics  
Getting Started



Adobe Acrobat  
Document

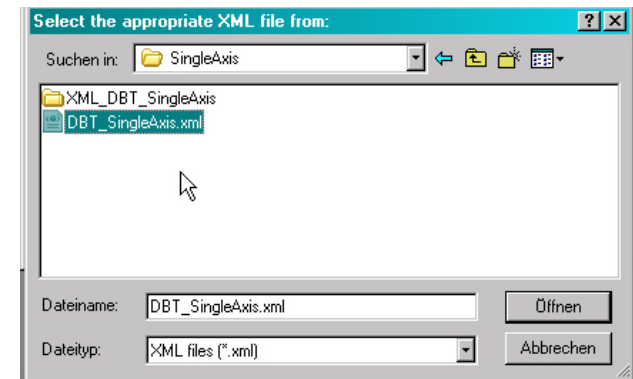
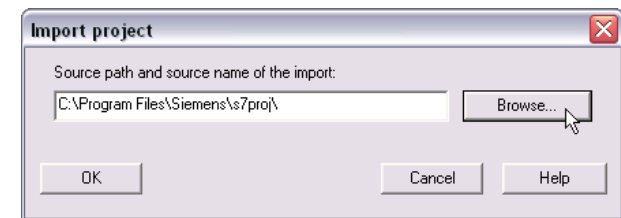
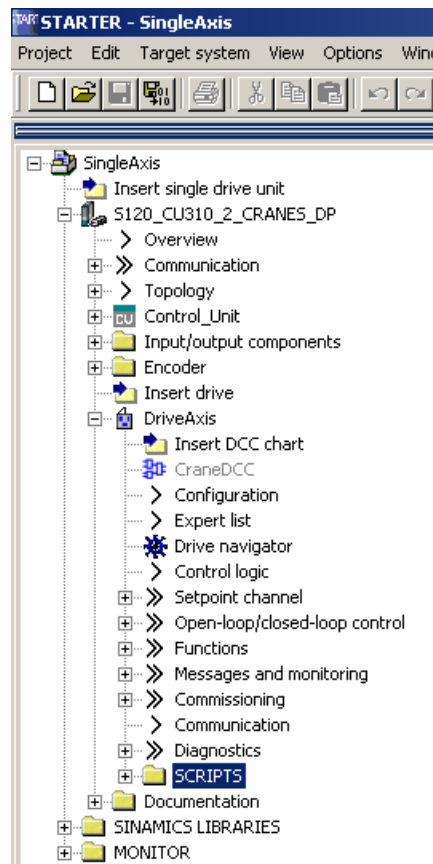
1. Import project of SIMOCRANE Drive-Based Technology
2. Configuration of Drive object
3. Running Script
4. Motor identification (Sinamics Getting Started)
5. Parameterization of Crane DCC-blocks



Refer to the manual “Sinamics Getting Started” and  
“SIMOCRANE Drive-Based Technology”, Chapter 6

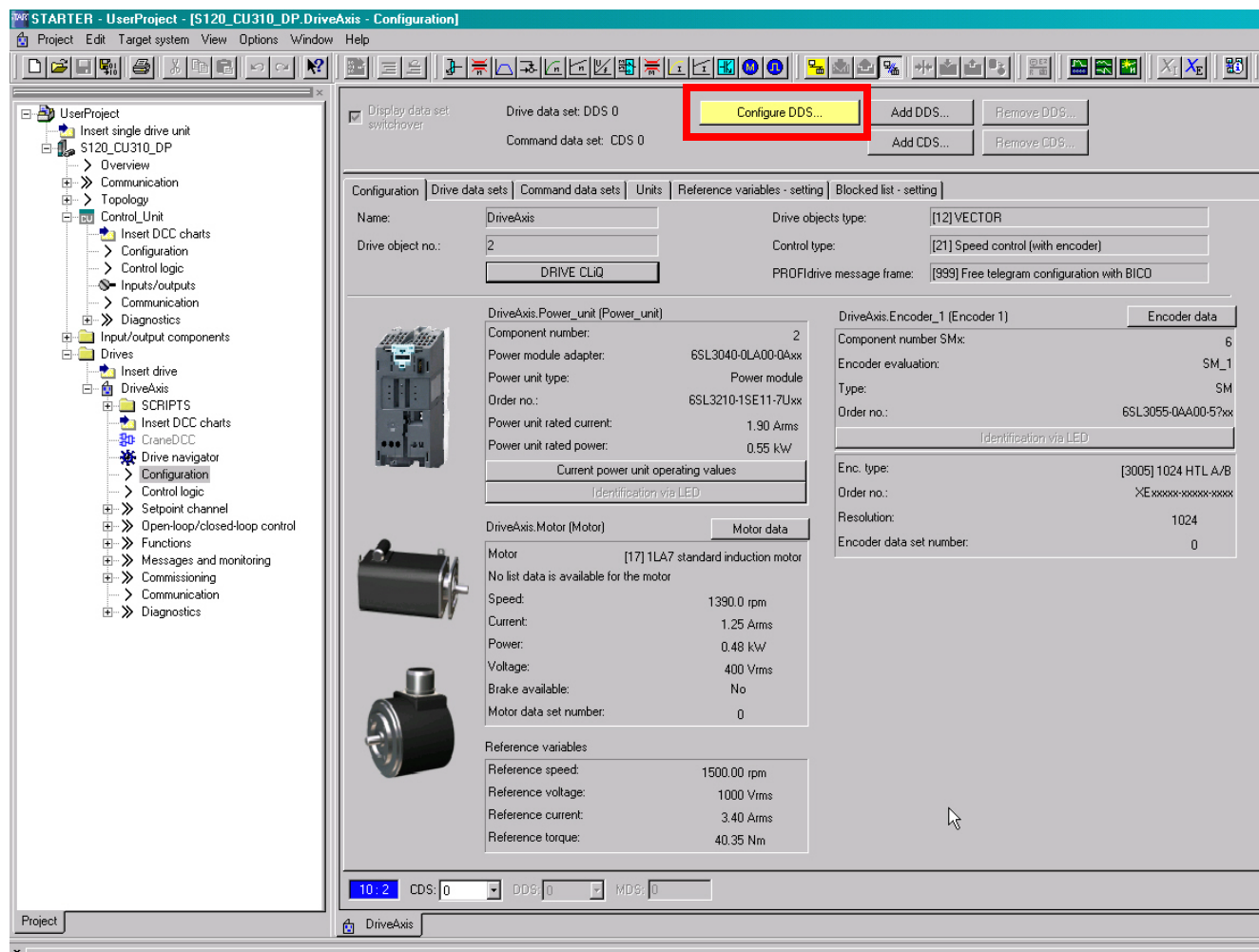
# Import project with the IMPORT function

1. Start the engineering tool STARTER
2. Actual project must be closed, then import the project



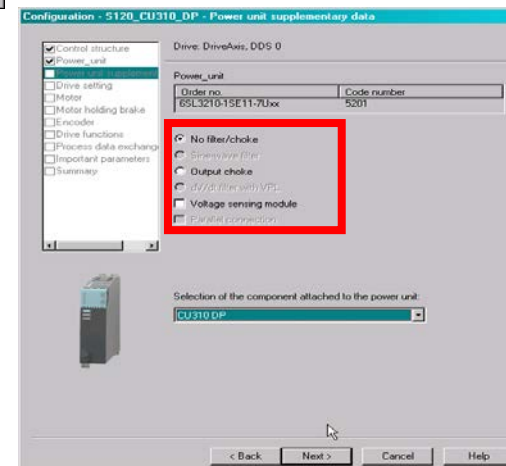
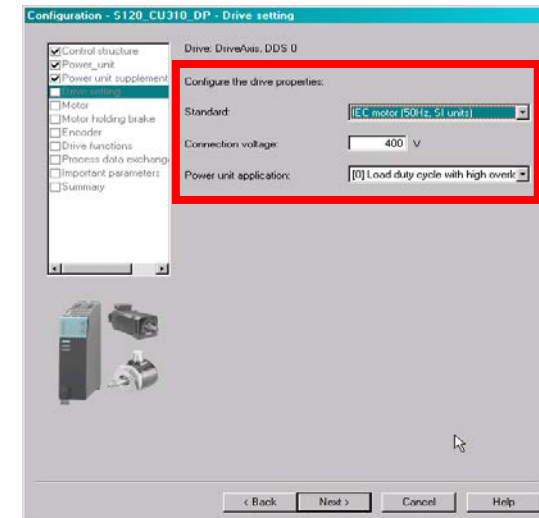
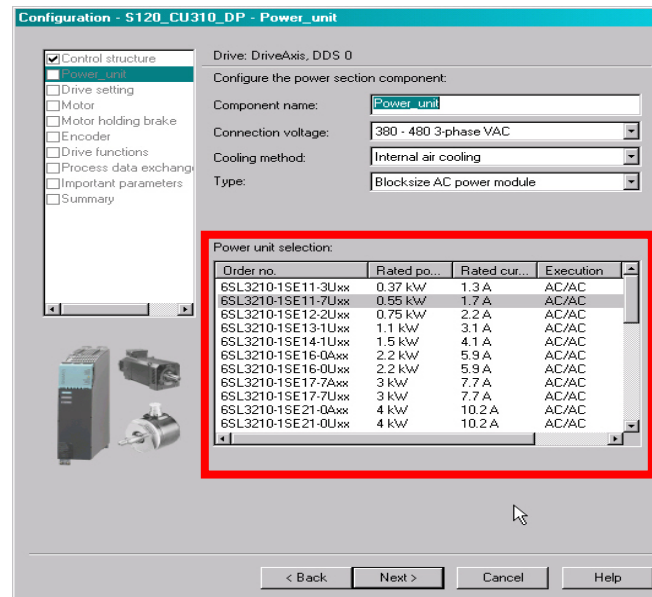
# Configuration of the Drive Object (DO)

## Step 2 Configuration DO





# Configuring of the power unit and drive properties



Step 2  
Configuration DO



# Configuring of motor

Configuration - S120\_CU310\_DP - Motor

Drive: DriveAxis, DDS 0, MDS 0

Control structure  
☒ Power\_unit  
☒ Power unit supplement  
☒ Drive setting  
☒ Motor  
☐ Motor holding brake  
☐ Encoder  
☐ Drive functions  
☐ Process data exchange  
☐ Important parameters  
☐ Summary

Configure the motor:

Motor name:

☐ Motor with DRIVE-CLIQ interface  
☐ Read out motor again  
☐ Select standard motor from list  
☒ Enter motor data

Motor type:

Parallel motor connection ☐ Number:

< Back Next > Cancel Help

Configuration - S120\_CU310\_DP - Calculation of the Motor/Controller Data

Drive: DriveAxis, DDS 0, MDS 0

Control structure  
☒ Power\_unit  
☒ Power unit supplement  
☒ Drive setting  
☒ Motor  
☒ Motor data  
☐ Motor holding brake  
☐ Encoder  
☐ Drive functions  
☐ Process data exchange  
☐ Important parameters  
☐ Summary

Calculation of the motor/controller data:

☐ No calculation  
☐ Complete calculation without equiv. circuit diagram data  
☒ Complete calculation with equiv. circuit diagram data

Note:  
 The basic settings of the current and speed control and limits as well as the ESB data are calculated from the entered type plate data.  
 (The type plate data must be complete.)  
 The calculation overwrites entered ESB data!  
 Input of the ESB data according to the data sheet is preferable to a calculation.

< Back Next > Cancel Help

Configuration - S120\_CU310\_DP - Motor data

Drive: DriveAxis, DDS 0, MDS 0

Control structure  
☒ Power\_unit  
☒ Power unit supplement  
☒ Drive setting  
☒ Motor  
☒ Motor data  
☐ Motor holding brake  
☐ Encoder  
☐ Drive functions  
☐ Process data exchange  
☐ Important parameters  
☐ Summary

Motor data, Induction motor (rotary):

Parameter	Parameter text	Value	Unit
p304[0]	Rated motor voltage	400	Vrms
p305[0]	Rated motor current	1.25	Arms
p307[0]	Rated motor power	0.48	kW
p308[0]	Rated motor power factor	0.840	
p310[0]	Rated motor frequency	50.00	Hz
p311[0]	Rated motor speed	1380.0	rpm
p335[0]	Motor cooling type	[0] Non-v	

The motor data must be entered completely!

☐ Do you want to enter the optional data?  
☐ Do you want to enter the equivalent circuit diagram data?

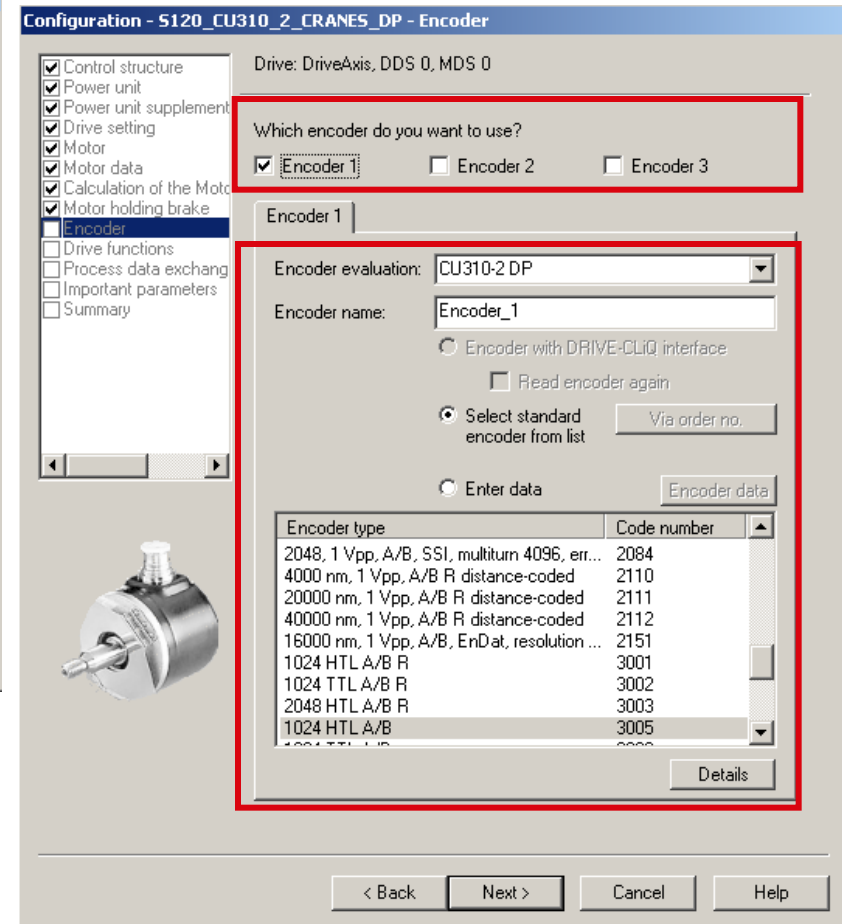
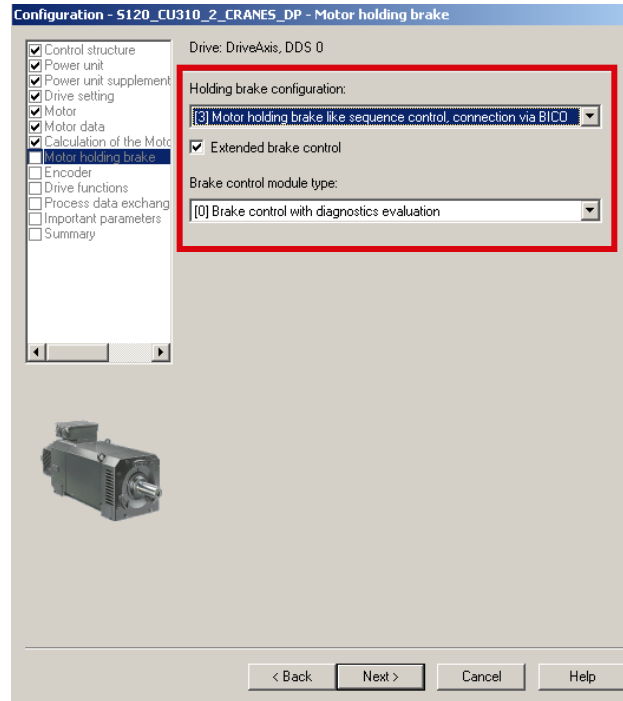
Note:  
 Deselection of the optional or equivalent circuit diagram data resets these irrevocably.  
 Motor identification is required when the equivalent circuit diagram data is deselected. Motor identification is optional when the equivalent circuit diagram data is entered.

< Back Next > Cancel Help

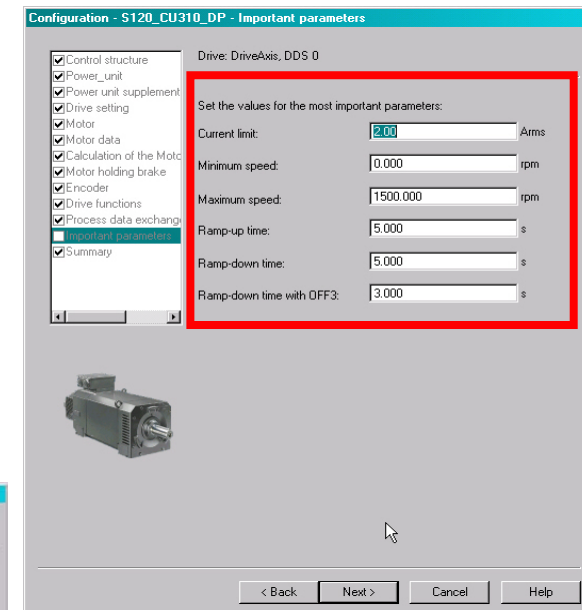
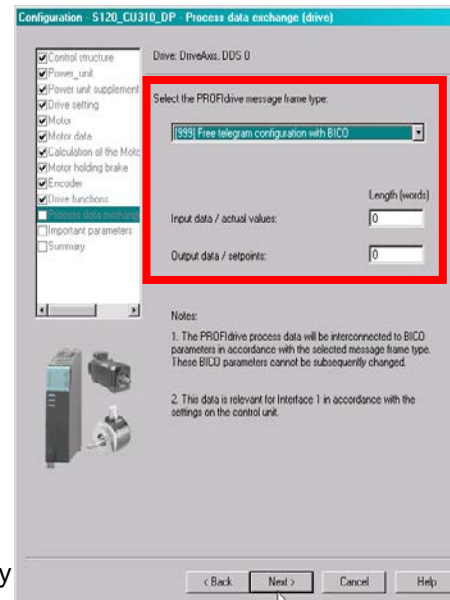
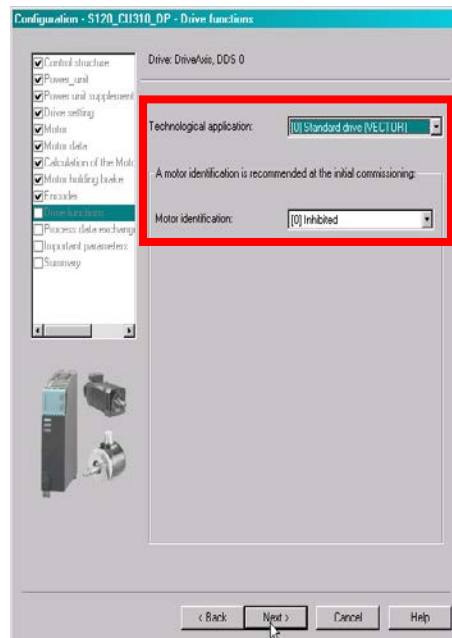
## Step 2 Configuration DO

# Configuring of holding brake and encoder

## Step 2 Configuration DO



# Select drive functions, communication frame type ..



## Step 2 Configuration DO

# Summary

## Step 2 Configuration DO

**Configuration - S120\_CU310\_DP - Summary**

☒ Control structure  
☒ Power\_unit  
☒ Power unit supplement  
☒ Drive setting  
☒ Motor  
☒ Motor data  
☒ Calculation of the Motor/Controller Data  
☒ Motor holding brake  
☒ Encoder  
☒ Drive functions  
☒ Process data exchange  
☒ Important parameters  
☐ Summary

The following data of the drive has been entered:

Control structure:  
Control type: [21] Speed control (with encoder)

Power unit component:  
Component name: Power\_unit  
Component type: AC-Power Module  
Order no.: 6SL3210-1SE11-7Uxx  
Rated power: 0.55 kW  
Rated current: 1.7 A

Power unit supplementary data:  
No filter/choke  
Adapter module: CU310 DP

Drive setting:  
Standard: IEC motor (50Hz, SI units)  
Connection voltage: 400 V  
Power unit application: [0] Load duty cycle with high overload for vector drives

Motor:  
Motor name: Motor  
Motor type: [17] 1LA7 standard induction motor

Motor data:  
p304[0]: Rated motor voltage 400 Vrms  
p305[0]: Rated motor current 1.25 Arms  
p307[0]: Rated motor power 0.48 kW  
p308[0]: Rated motor power factor 0.840  
p310[0]: Rated motor frequency 50.00 Hz  
p311[0]: Rated motor speed 1390.0 rpm  
p335[0]: Motor cooling type [0] Non-ventilated

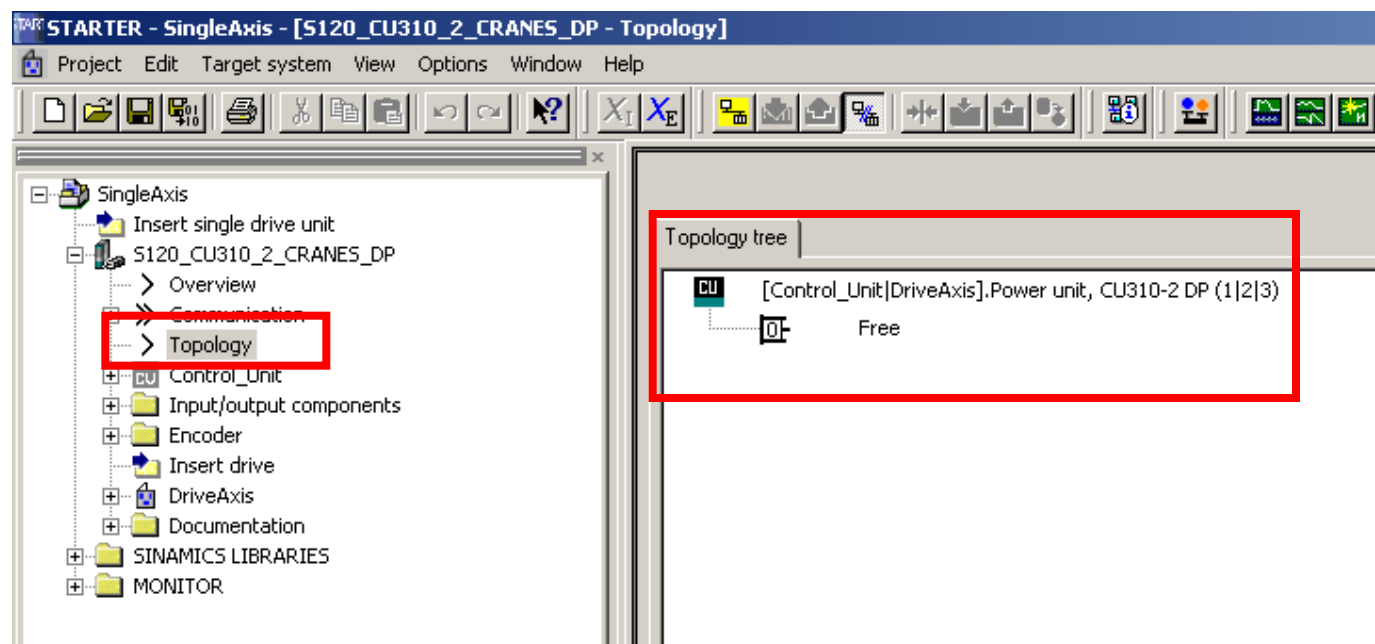
Calculation of the Motor/Controller Data:  
Complete calculation with equiv. circuit diagram data

Motor holding brake:  
Motor holding brake: Not available

Copy text to clipboard

< Back   Finish   Cancel   Help

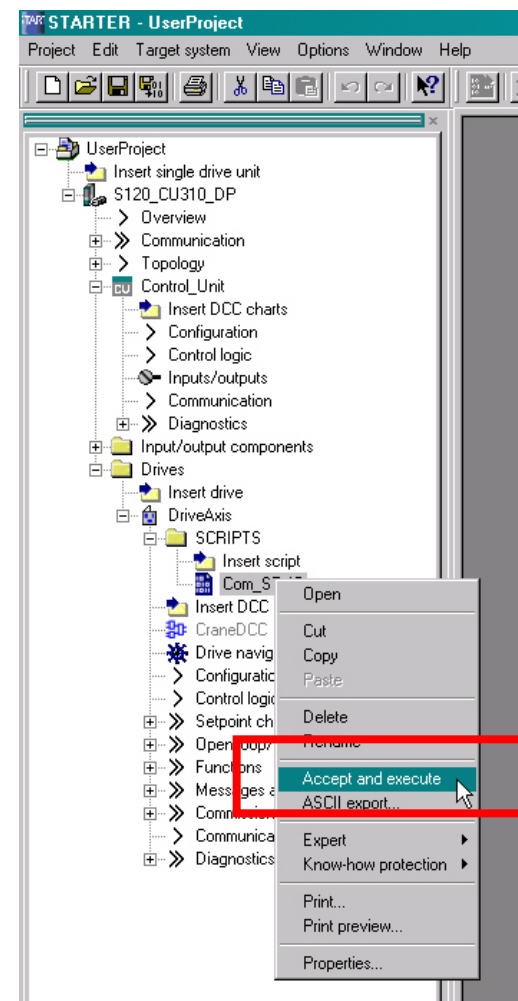
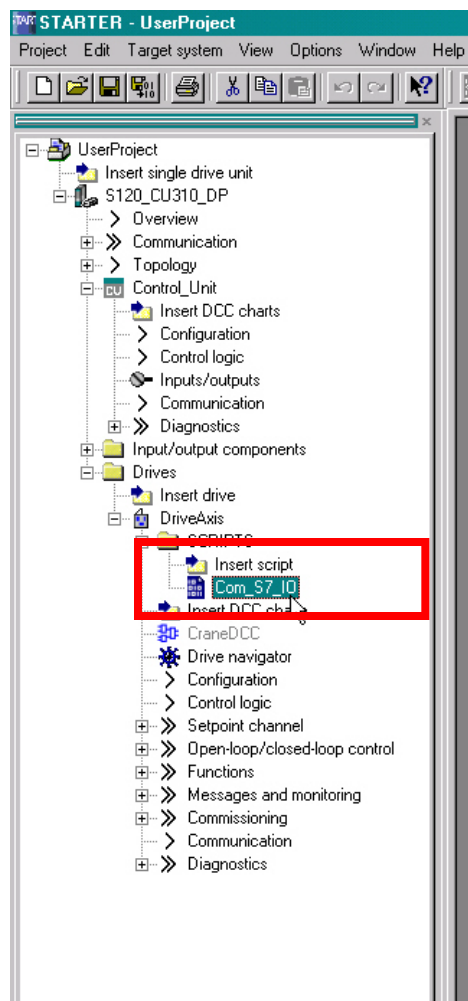
# Check Topology



## Step 2 Configuration DO

# Execute Script file

## Step 3 Running Script





## Script file window

http:// - SIMOCRANE Drive Based Technology - Siemens AG

SIMOCRANE Drive-Based Technology

The script file is a help for the application to connect the BICO - parameters by using Profibus or I/O - communication automatically. Besides the Crane DCC-blocks will also be connected depending of the selected axis. The Script file can be extended by the user. Since variance cannot be precluded entirely, we cannot guarantee full consistency.

Path and Name for Logfile

D:\logfile.txt

Select the drives in your project

☐ HOIST

☒ GANTRY / TROLLEY

Select the communication in your project

☐ PROFIBUS DP

☒ ONBOARD I/O

Select the master switch setpoint in your project

Attention only for ONBOARD I/O communication

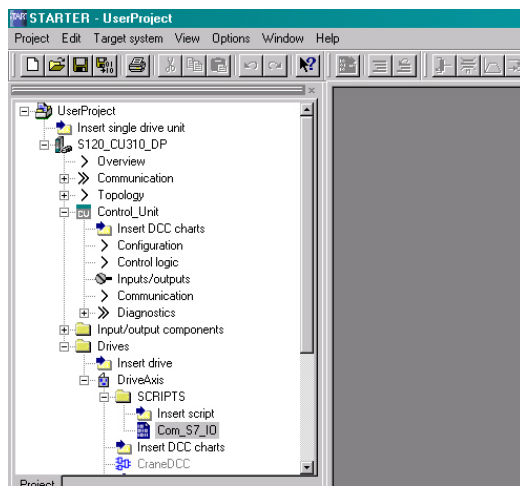
☐ Analog master-switch

☒ Digital master-switch

OK CANCEL

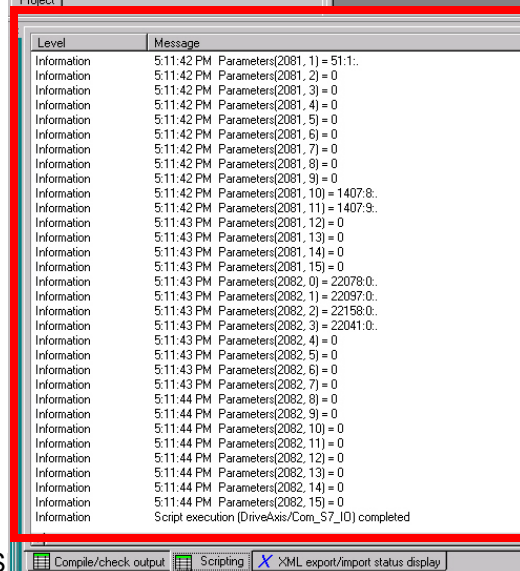
### Step 3 Running Script

# Running script



In the script window all parameter settings will be shown.

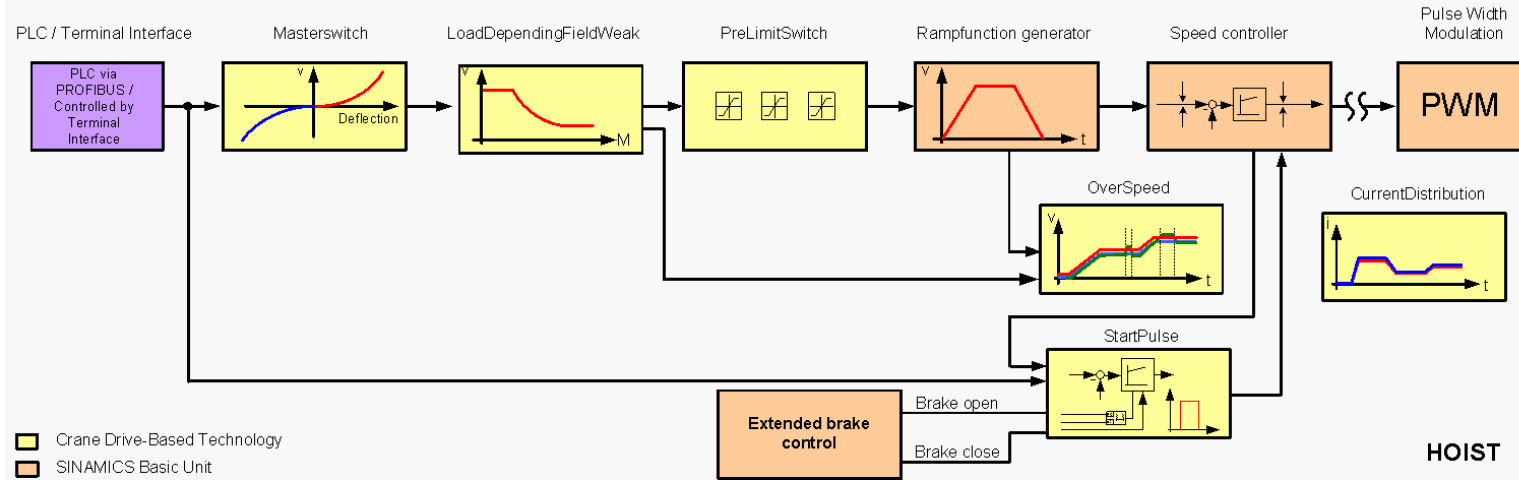
A log-file can be saved for documentation



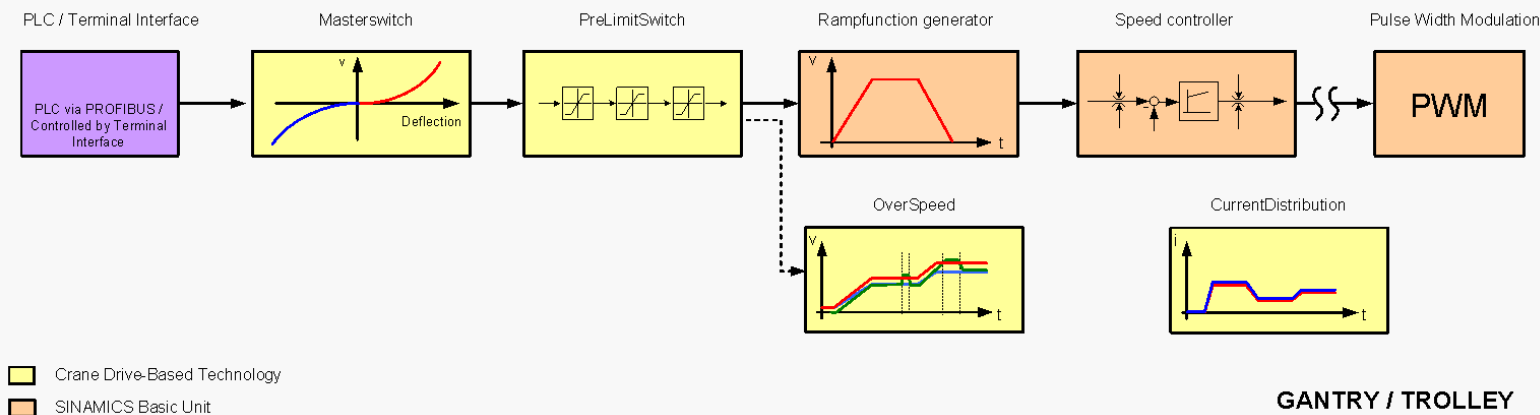
## Step 3 Running Script



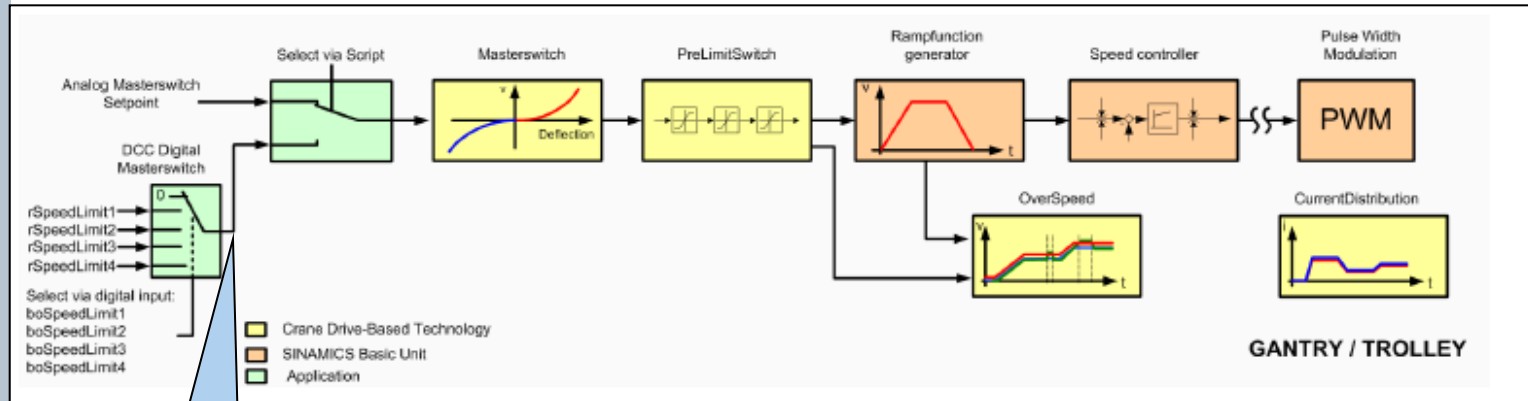
# Setpoint channel in CU310-2 after running script (via Profibus control)



## Step 3 Running Script



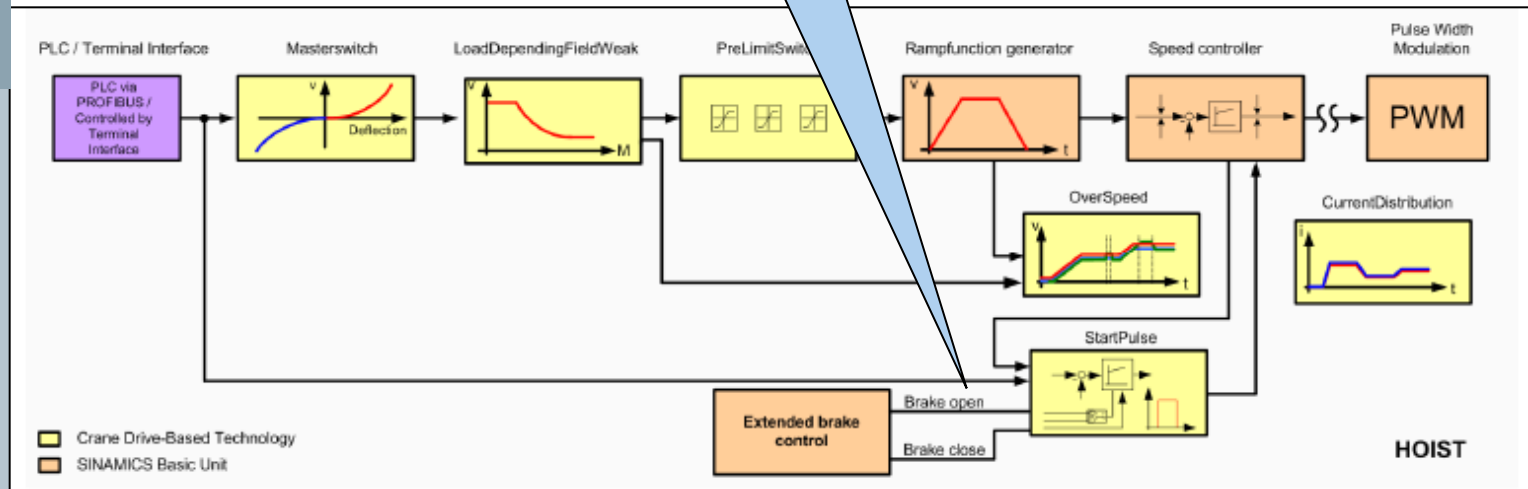
# Hoist Setpoint channel in CU310-2 after running script (via Onboard I/O with digital masterswitch or Profibus control)



Digital Master-Switch

Combination of Brake control and StartPulse

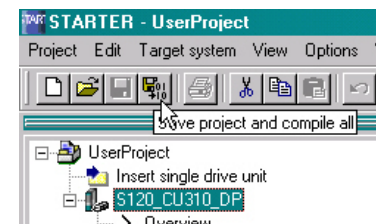
## Step 3 Running Script



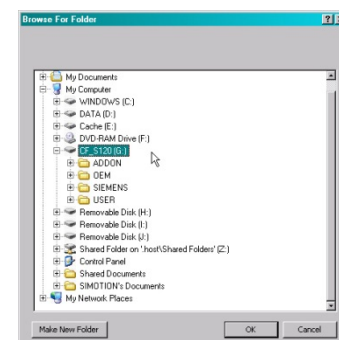
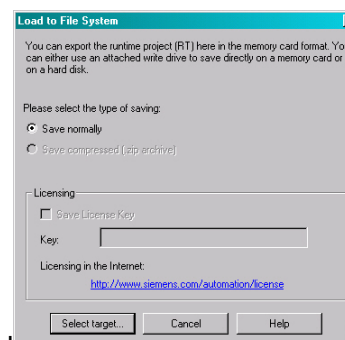
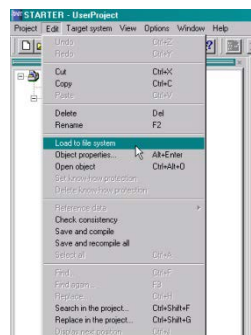
## Download into CF-card

Save and compile the project and then the project can be downloaded in two ways:

1. With STARTER go online via Profibus to SINAMICS CU310-2 and download the project into the device.

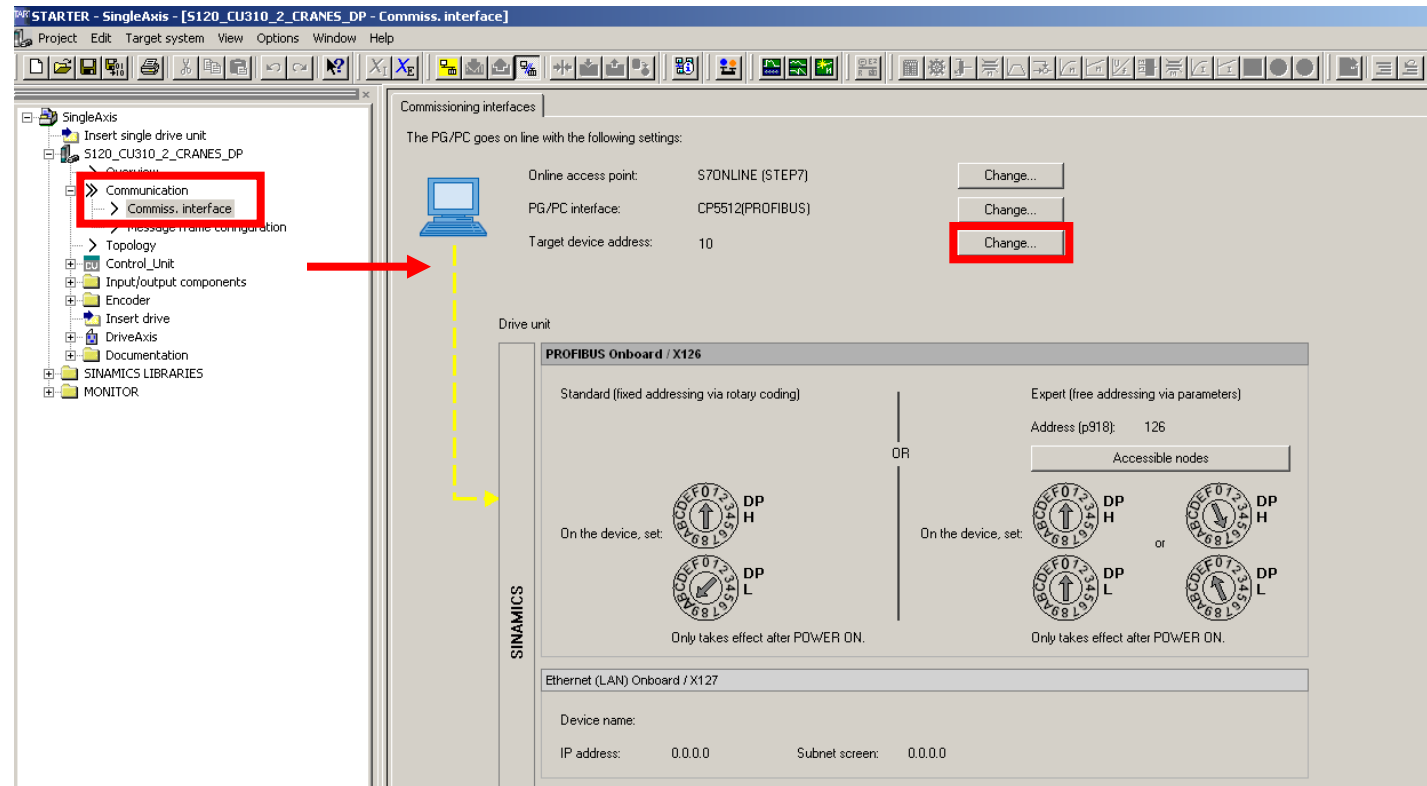


2. Put the Compact Flash card into a card reader and download the project direct to the CF card and then put the CF card into the device.



# Communication Interface via Profibus

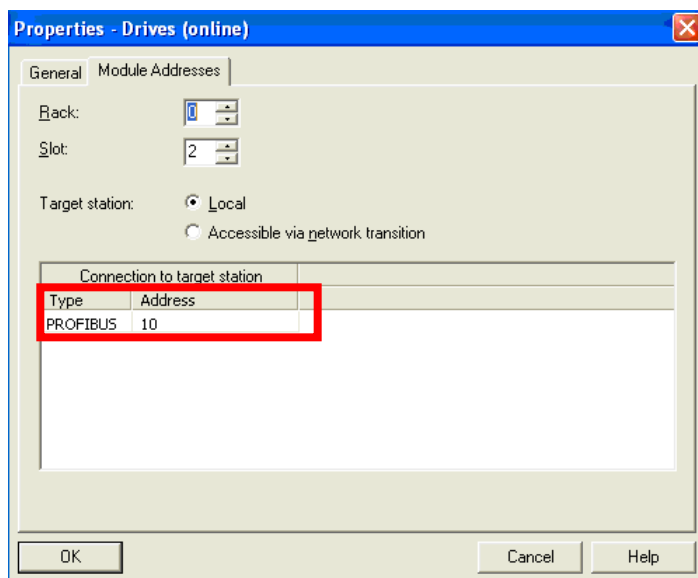
For online download the profibus address must be configured as follows:



Step 4  
Motor identification

## Communication Interface via Profibus

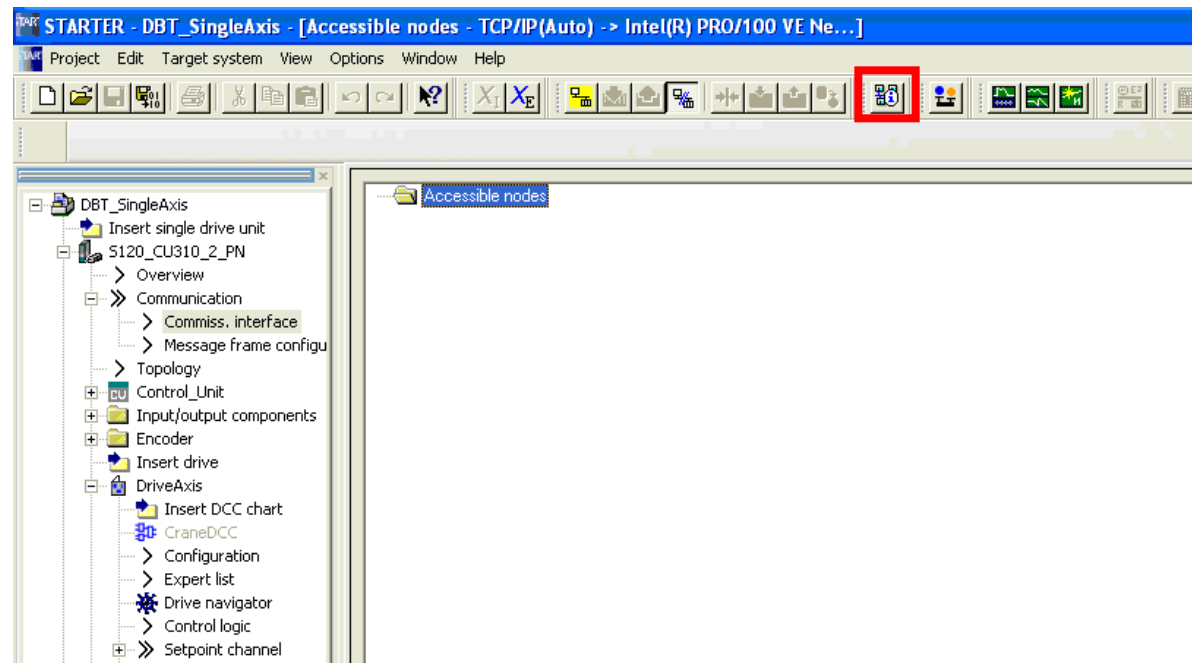
- The profibus address is entered here. (This must correspond to the profibus address found on the CU310-2)



- The profibus address can be set on the CU310-2 by setting the switches found underneath the BOP.

## Communication interface via Ethernet (1)

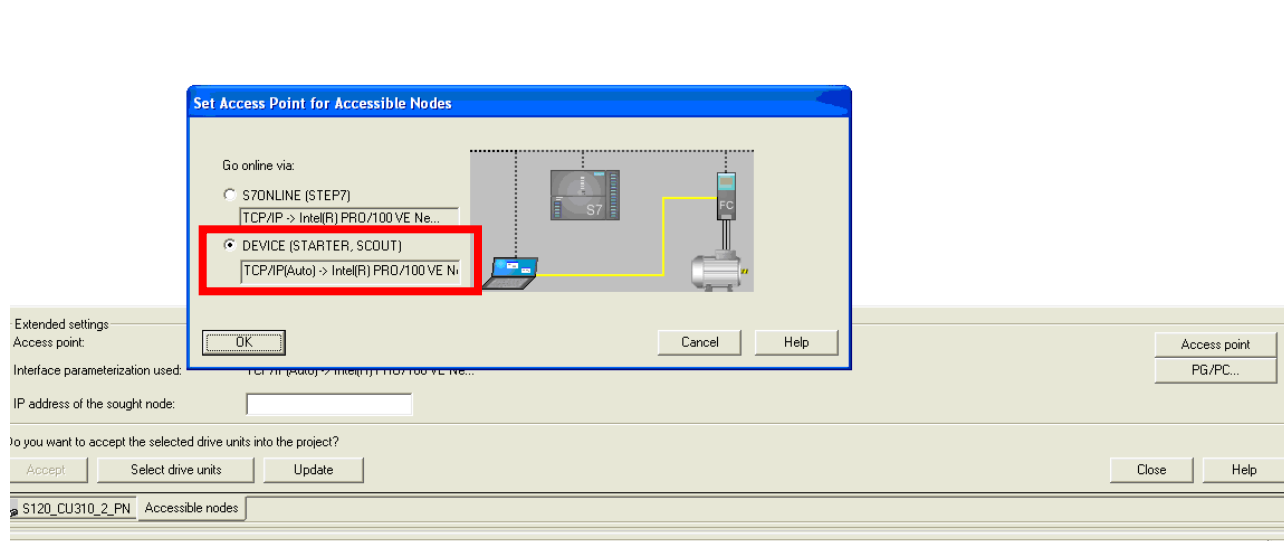
- For using an Ethernet connection to connect to the control unit select the accessible nodes button to find device.



### Step 4 Motor identification

## Communication interface via Ethernet (2)

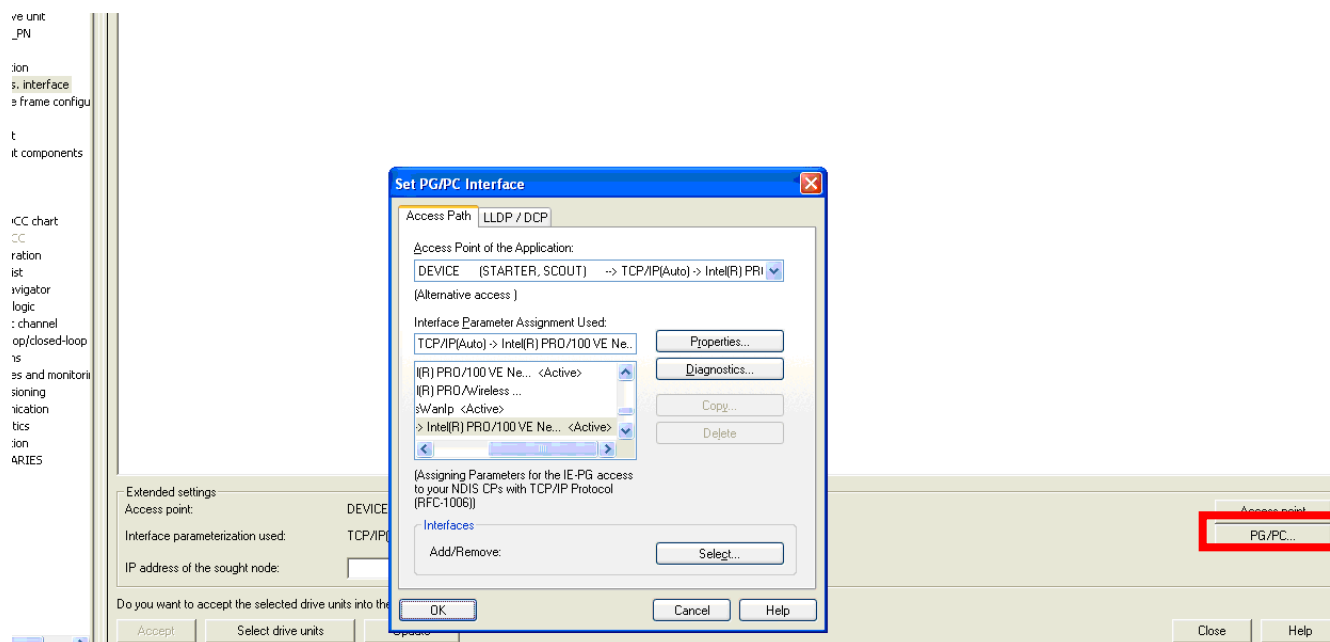
- If the device is not found immediately:
  1. Set access point to device in the accessible nodes tab.



### Step 4 Motor identification

## Communication interface via Ethernet (3)

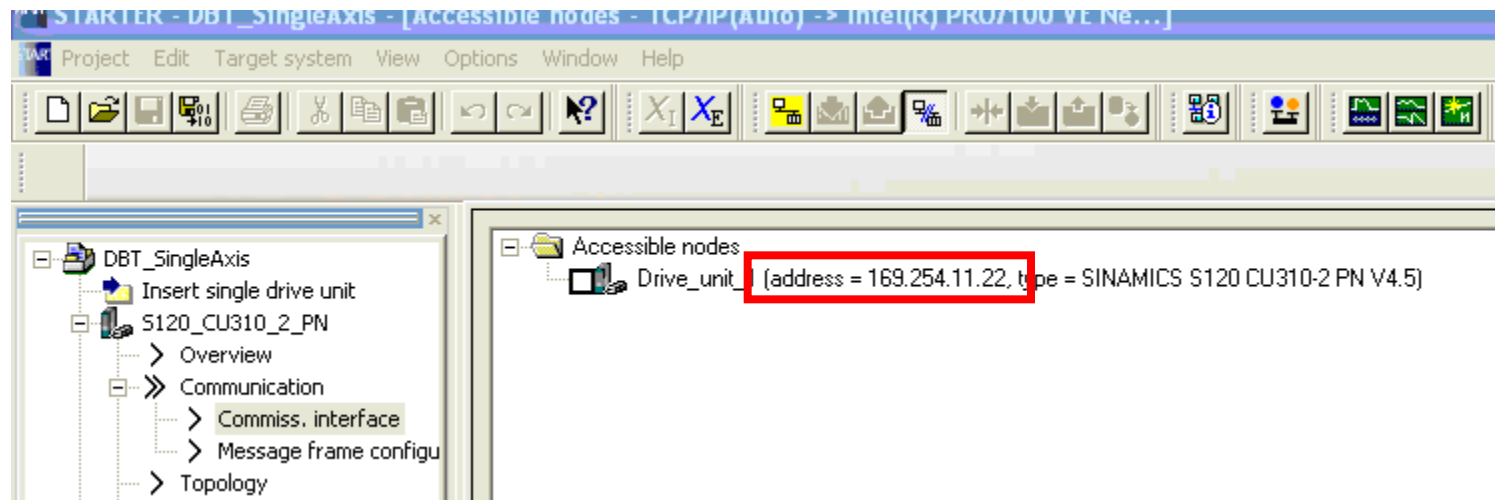
- Set the PG/PC interface in the accessible nodes tab. (Tip: Select component which has <Active> written after it).





## Communication interface via Ethernet (4)

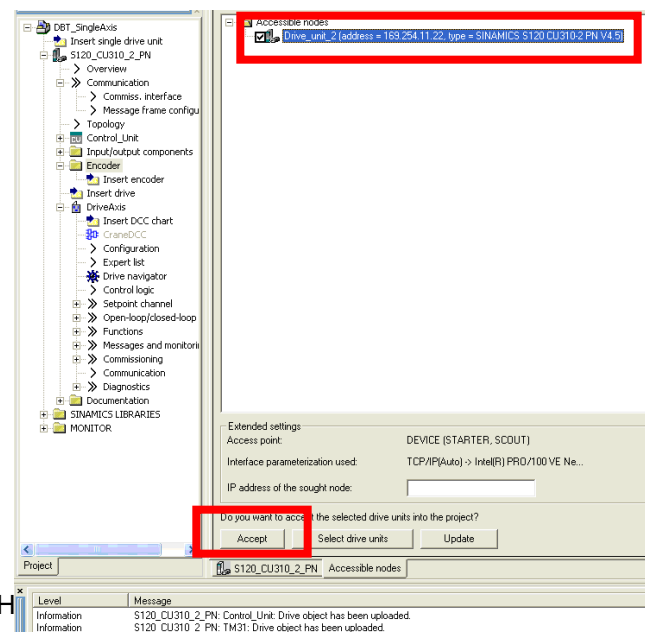
3. Select search for accessible nodes again.
4. When the device is found note the IP address.



### Step 4 Motor identification

## Communication interface via Ethernet (5)

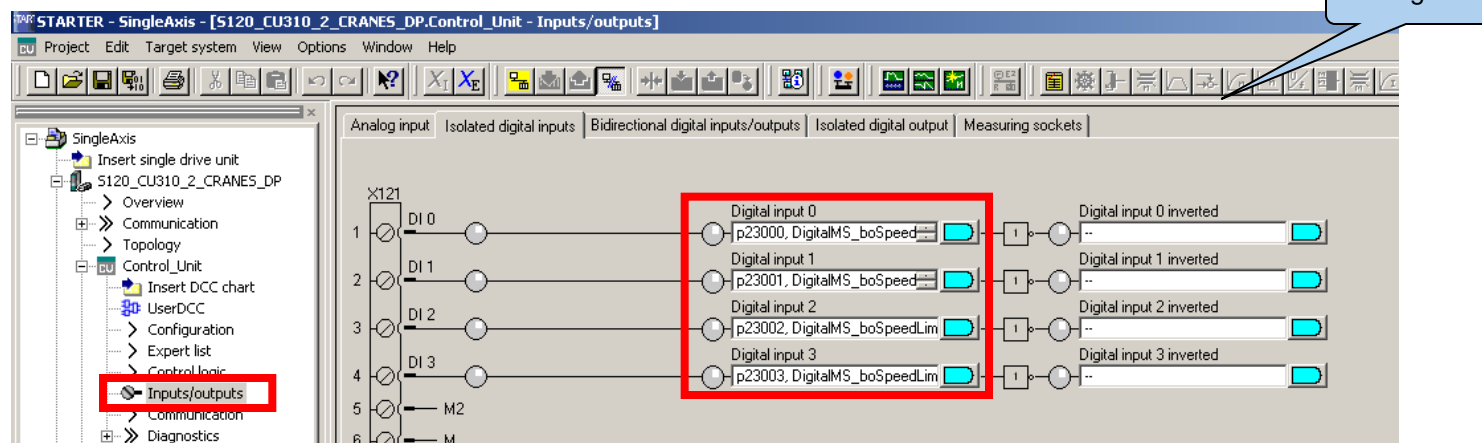
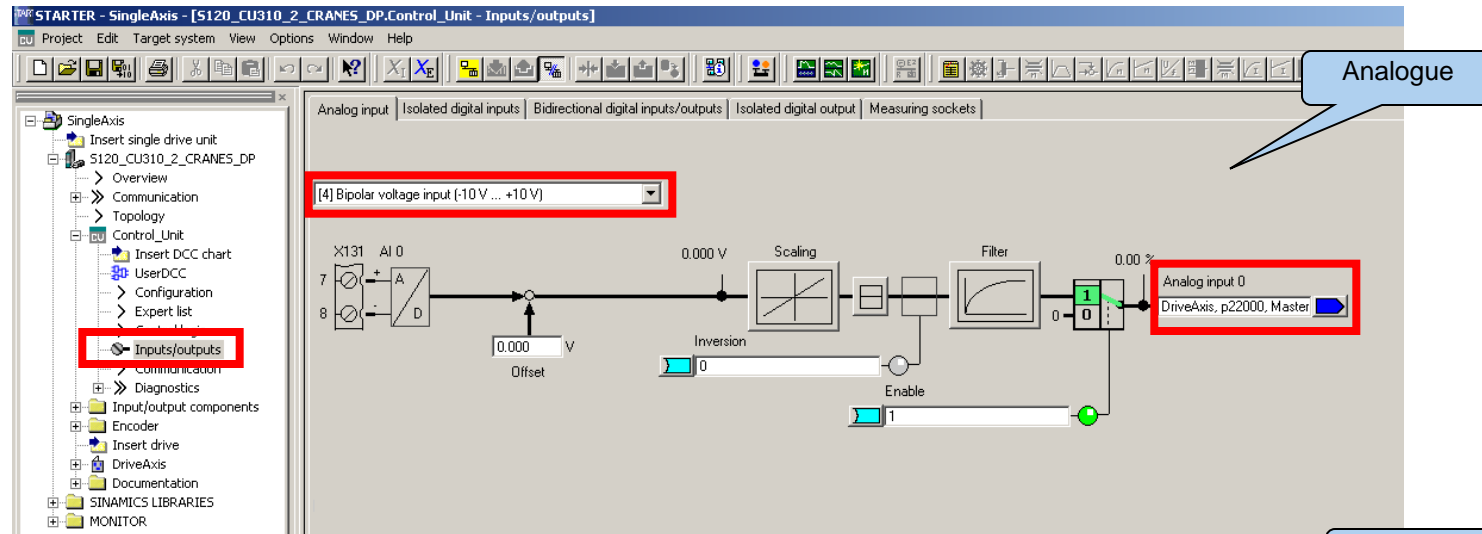
5. Adjust the PG/PC IP address so that it will have the same first 3 numbers as the address of the device but with a different fourth number. (E. g. If the device address is 169.254.11.22 then the PC/PG address should be changed accordingly to an address with the same first 3 numbers but a different fourth e. g. 169.254.11.1)
6. Highlight device in accessible nodes tab and accept device into project.



## Step 4 Motor identification



# Overview of I/O-Signals



## Step 4 Motor identification

# Overview of parameter list

STARTER - SingleAxis - [S120\_CU310\_2\_CRANES\_DP.DriveAxis - Expert list]

Project Edit Target system View Options Window Help

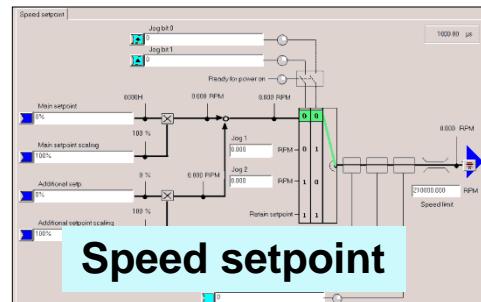
Enter search text

hexadecimal

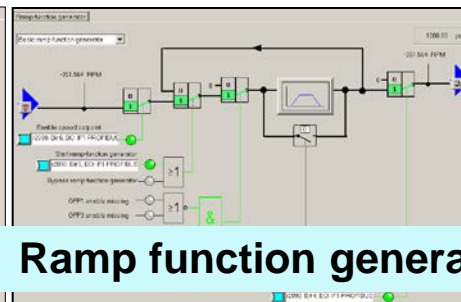
Expert list

Param...	Data	Parameter text	Offline value DriveAxis	Unit
All	All	All	All	All
1339	r21005[0]	Computing time load of the run-time group, Run-time group 1	0.0	%
1340	r21008[0]	Hardware sampling times available, Hardware 1	0.000	ms
1341	p22000	MasterSwitch_rInSpeedSetpointMS [%]	Control_Unit : r755[0]	
1342	p22001	MasterSwitch_boEnableMasterSwitch	0	
1343	p22002	MasterSwitch_boPositiveDeflection	Control_Unit : r722.0	
1344	p22003	MasterSwitch_boNegativeDeflection	Control_Unit : r722.1	
1345	p22004	MasterSwitch_rX1DeflectionParameter [%]	5 000	
1346	p22005	MasterSwitch_rY1SpeedParameter [%]	5.000	
1347	p22006	MasterSwitch_rX2DeflectionParameter [%]	10.000	
1348	p22007	MasterSwitch_rY2SpeedParameter [%]	10.000	
1349	p22008	MasterSwitch_rX3DeflectionParameter [%]	25.000	
1350	p22009	MasterSwitch_rY3SpeedParameter [%]	25.000	
1351	p22010	MasterSwitch_rX4DeflectionParameter [%]	50.000	
1352	p22011	MasterSwitch_rY4SpeedParameter [%]	50.000	
1353	p22012	MasterSwitch_rX5DeflectionParameter [%]	75.000	
1354	p22013	MasterSwitch_rY5SpeedParameter [%]	75.000	
1355	p22014	MasterSwitch_rX6DeflectionParameter [%]	100.000	
1356	p22015	MasterSwitch_rY6SpeedParameter [%]	100.000	
1357	r22016	MasterSwitch_rOutSpeedSetpointMS [%]	0.000	
1358	p22030	OverSpeed_rSpeedSetpoint [%]	DriveAxis : r62	
1359	p22031	OverSpeed_rActualSpeed [%]	DriveAxis : r63[0]	
1360	p22032	OverSpeed_rRatedSpeed [rpm]	1500.000	
1361	p22033	OverSpeed_rReferenceSpeed [rpm]	DriveAxis : r2700	
1362	p22034	OverSpeed_rAfterRampGen [%]	DriveAxis : r22159	
1363	p22035	OverSpeed_boEnableFieldWeak	DriveAxis : r22158.0	
1364	p22036	OverSpeed_boResetLoadCurrent	Control_Unit : r722.19	
1365	p22037	OverSpeed_boReset	DriveAxis : r2138.7	
1366	p22038	OverSpeed_boEnableSetpointActualMonitoring	Control_Unit : r722.13	
1367	p22039	OverSpeed_rOffset [%]	10.000	
1368	p22040	OverSpeed_rDelayTime [ms]	250.000	
1369	r22041	OverSpeed_boOverspeed	0H	
1370	p22050	PreLimitSwitch_rInSpeedSetpointPLS [%]	DriveAxis : r22156	
1371	p22051	PreLimitSwitch_boBit1LimitSpeed	Control_Unit : r722.20	
1372	p22052	PreLimitSwitch_boBit2LimitSpeed	Control_Unit : r722.21	
1373	p22053	PreLimitSwitch_boPreLimitSwitch	Control_Unit : r722.22	
1374	p22054	PreLimitSwitch_rLimit1 [%]	100.000	

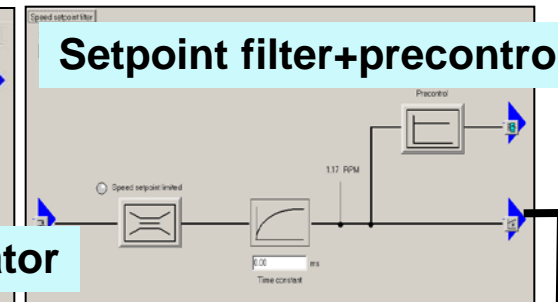
# Mainstream of speed setpoint and closed-loop control



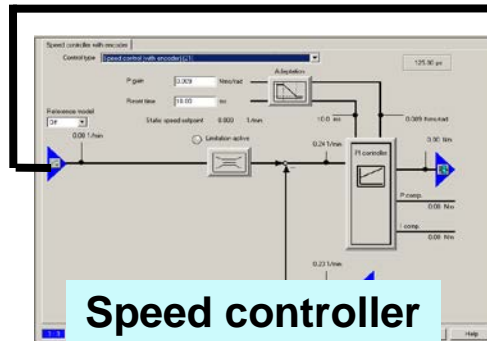
Speed setpoint



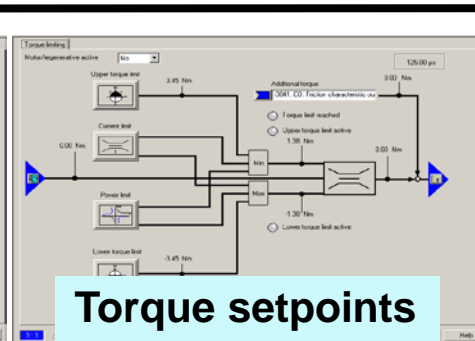
Ramp function generator



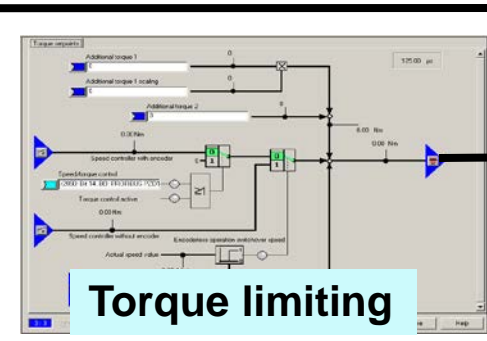
Setpoint filter+precontrol



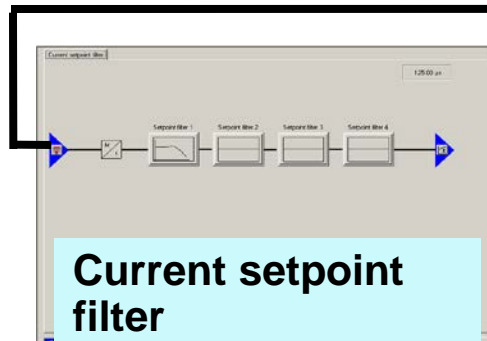
Speed controller



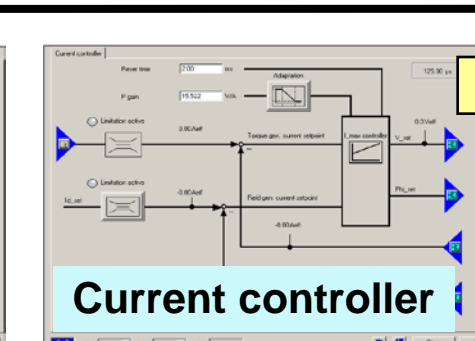
Torque setpoints



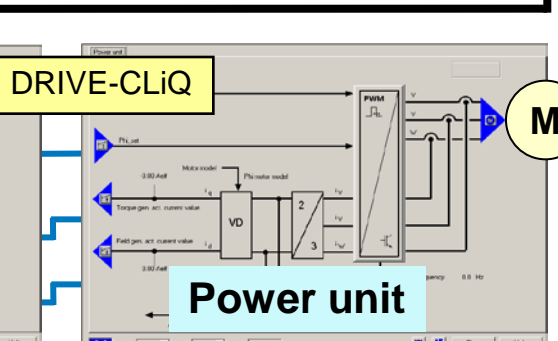
Torque limiting



Current setpoint filter



Current controller

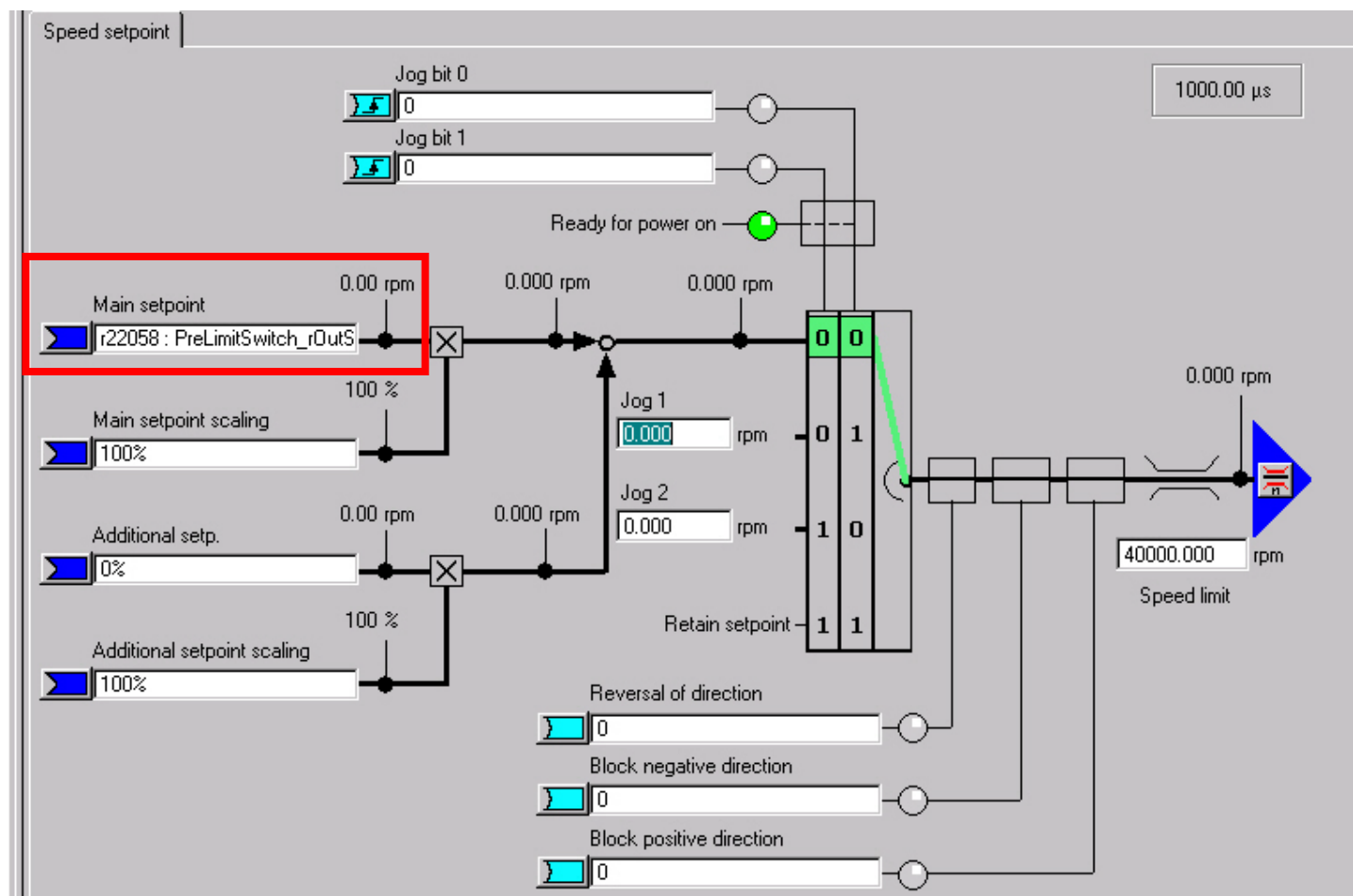


Power unit

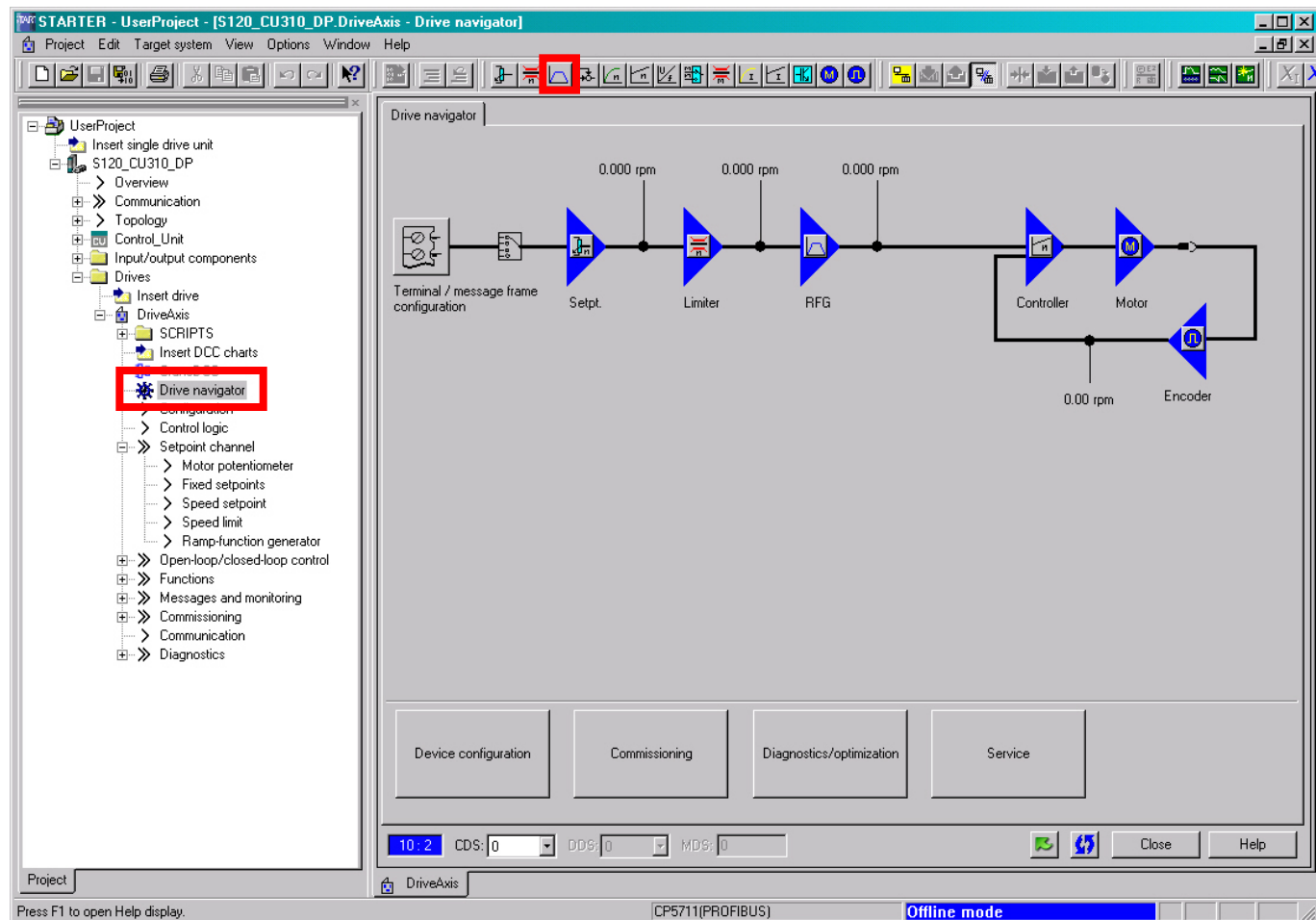
DRIVE-CLiQ

M

# Speed setpoint



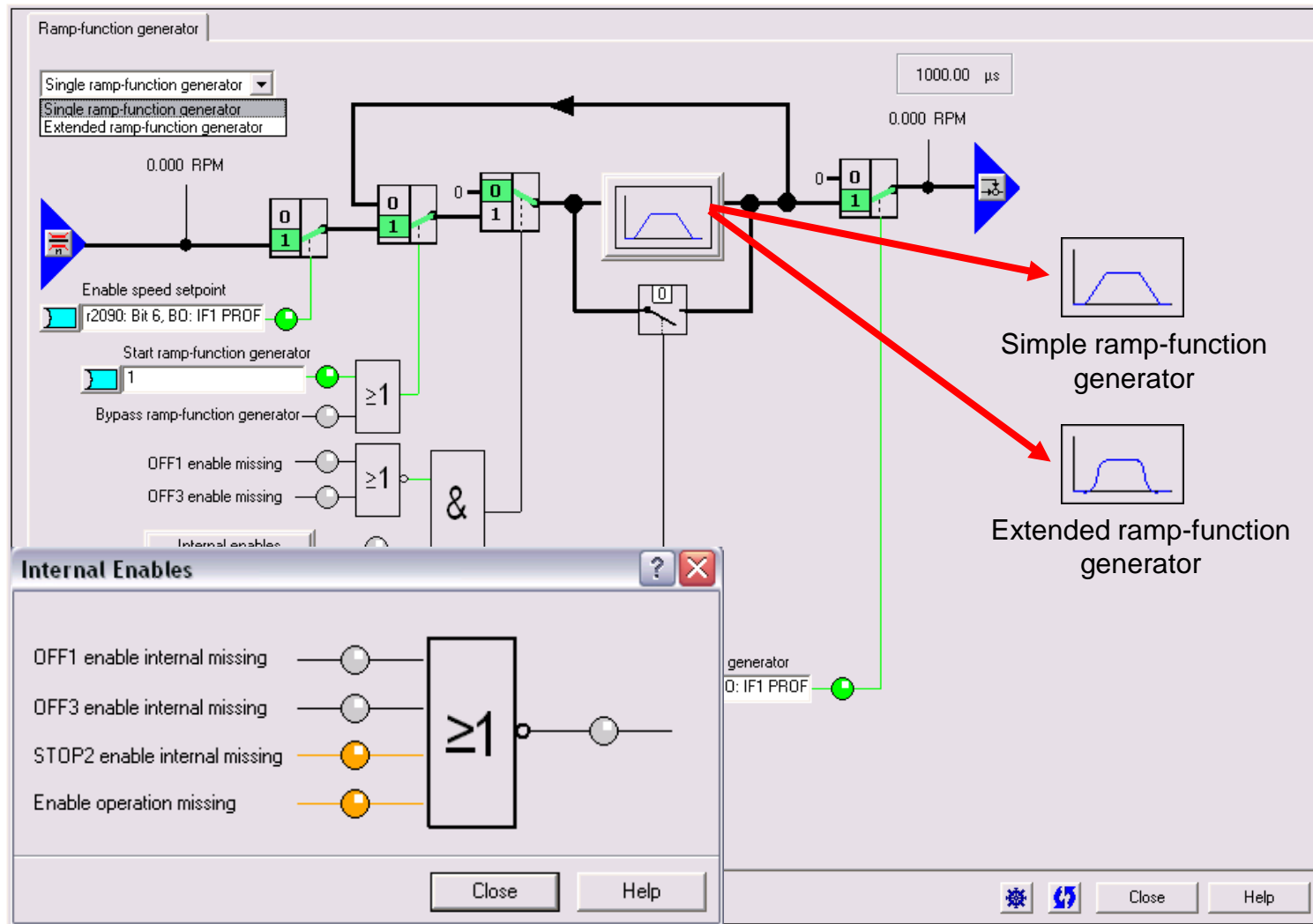
# Ramp-function generator



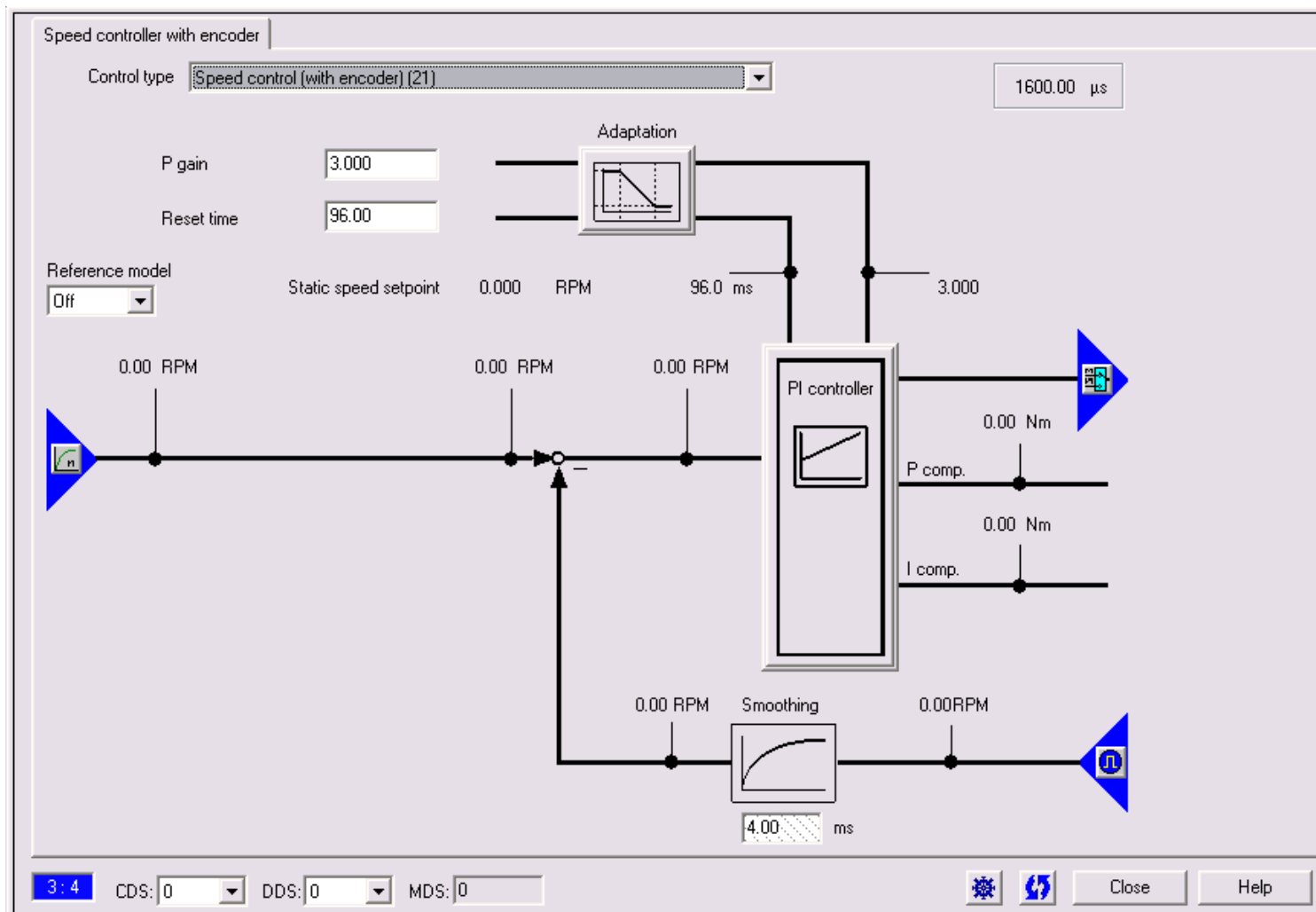
## Step 4 Motor identification



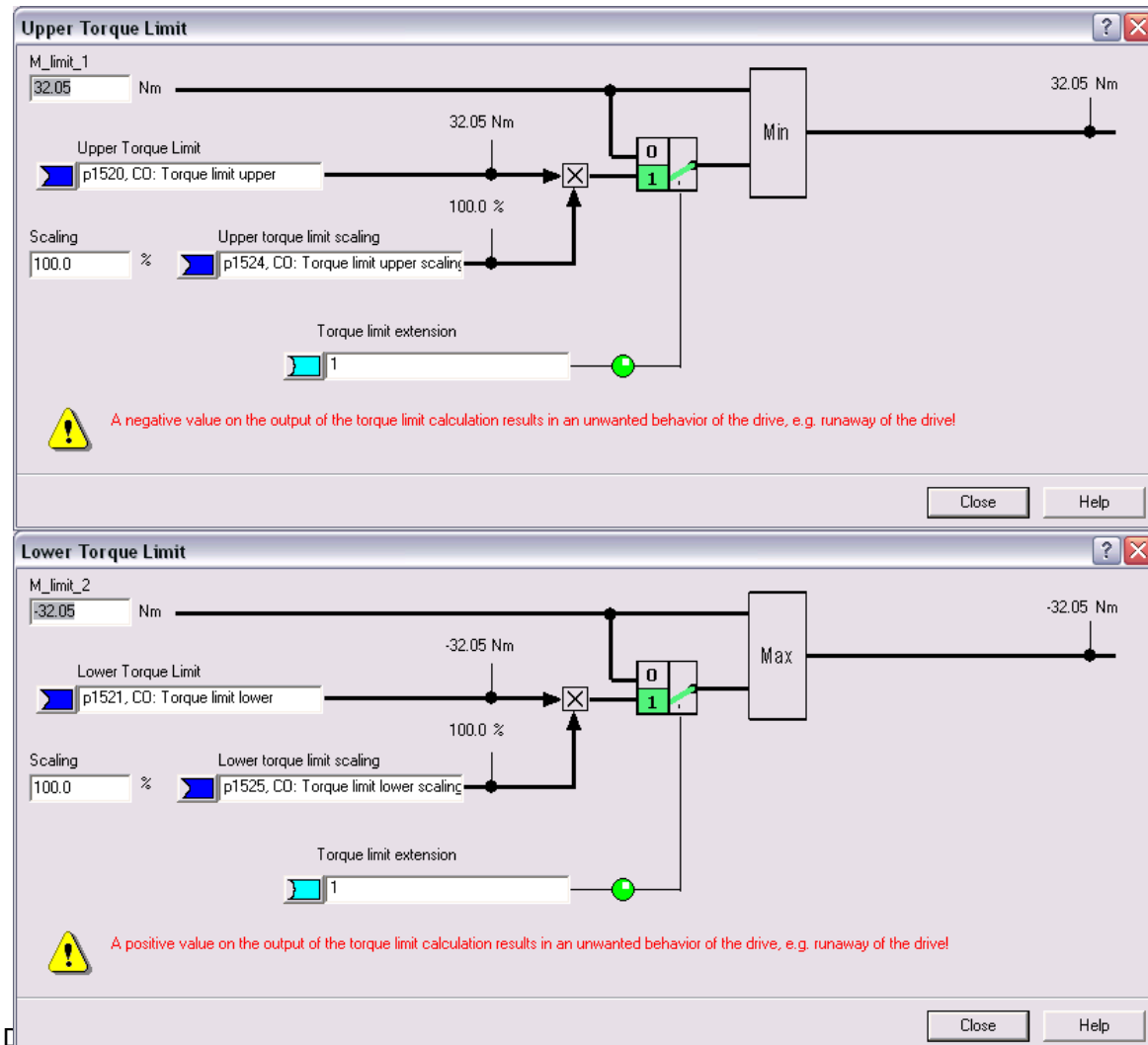
# Ramp-function generator



# Speed controller

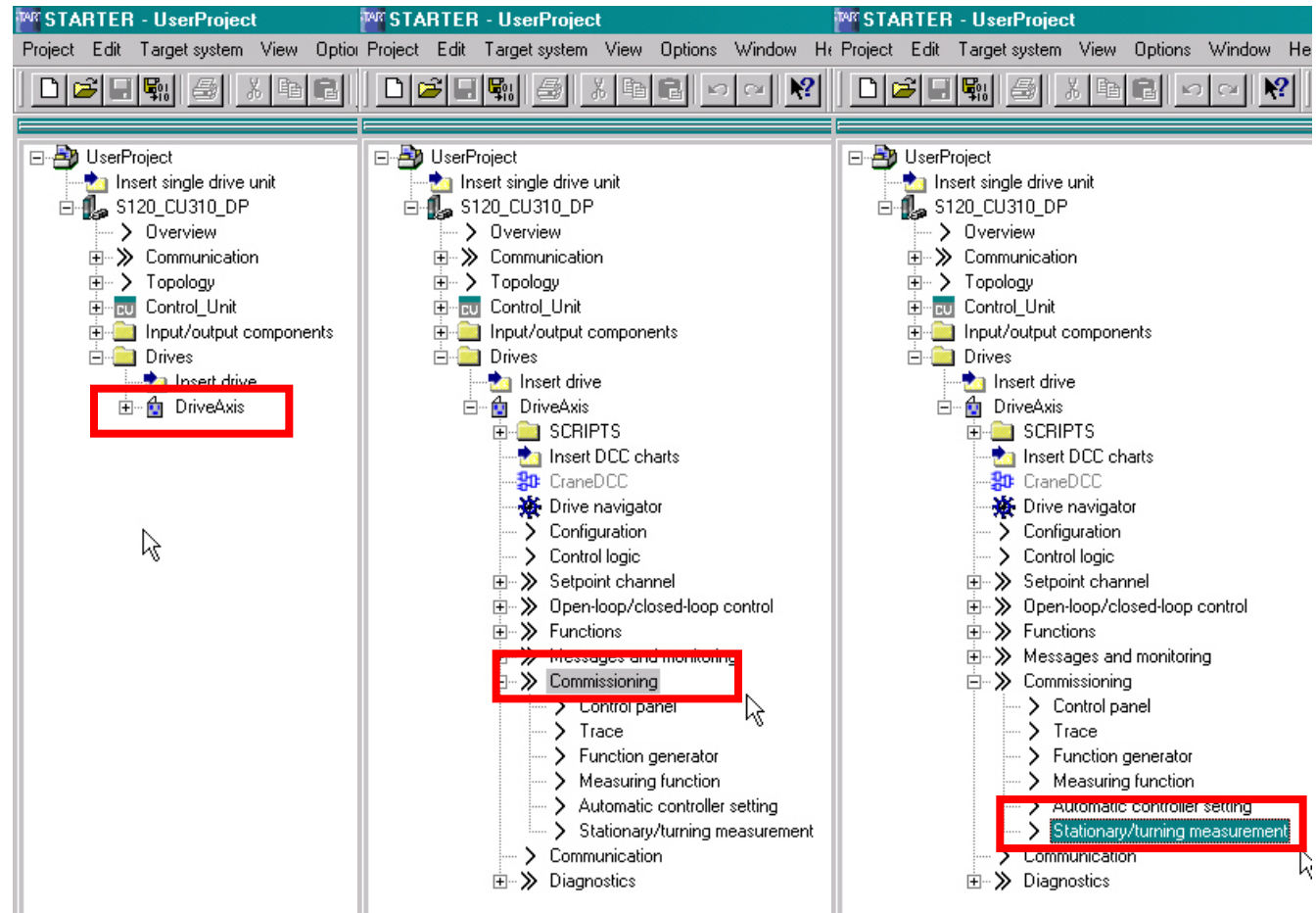


# Upper and Lower Torque Limit



## Step 4 Motor identification

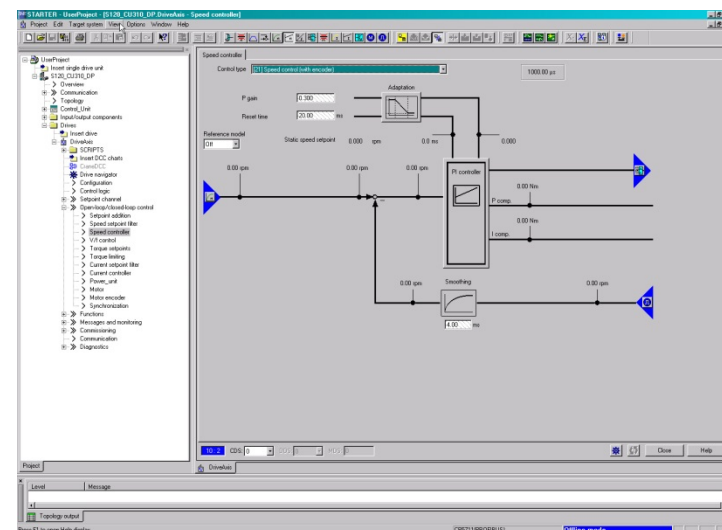
# Introduction stationary measurement



## Step 4 Motor identification

## Purpose of stationary measurement (refer to Chapter 6.3)

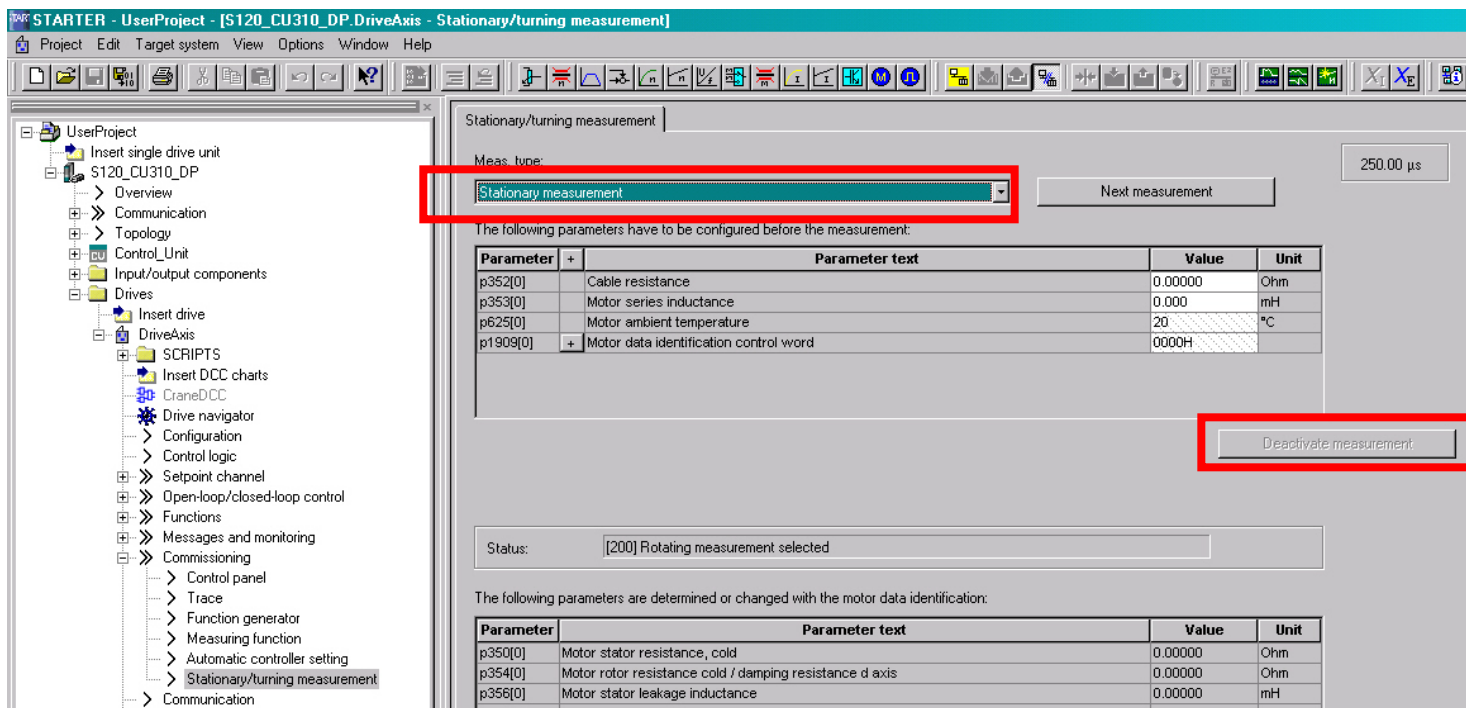
- SINAMICS Drive Object
  - Stationary measurement
    - Equivalent circuit diagram data
    - Total resistance for:
      - power cable resistance and
      - stator resistance
    - IGBT on-state voltage or compensation for the IGBT lockout times
  - Control Panel (speed direction check, if necessary directional change, p1821)



### Step 4 Motor identification

# Start stationary measurement

1. Select stationary measurement from the drop down menu.
2. Activate measurement.



## Step 4 Motor identification

# Results of the stationary measurement

STARTER - UserProject - [S120\_CU310\_DP.DriveAxis - Stationary/turning measurement]

Project Edit Target system View Options Window Help

Stationary/turning measurement

Meas. type: Stationary measurement 250.00  $\mu$ s

Next measurement

The following parameters have to be configured before the measurement:

Parameter	Parameter text	Value	Unit
p352[0]	Cable resistance	0.00000	Ohm
p353[0]	Motor series inductance	0.000	mH
p625[0]	Motor ambient temperature	20	$^{\circ}$ C
p1909[0]	Motor data identification control word	0000H	

Deactivate measurement

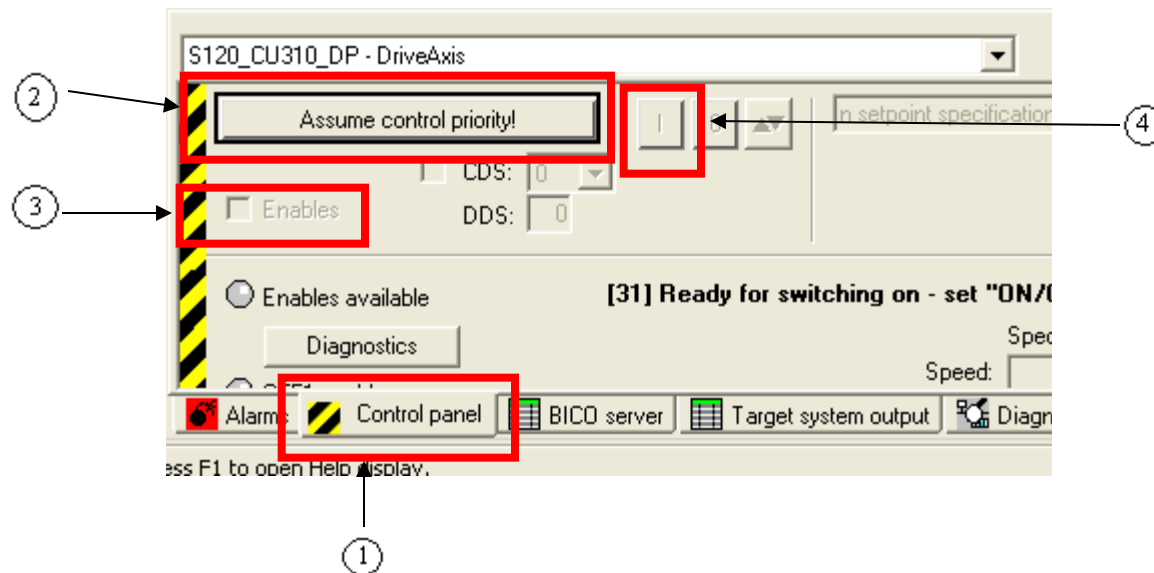
Status: [200] Rotating measurement selected

The following parameters are determined or changed with the motor data identification:

Parameter	Parameter text	Value	Unit
p350[0]	Motor stator resistance, cold	0.00000	Ohm
p354[0]	Motor rotor resistance cold / damping resistance d axis	0.00000	Ohm
p356[0]	Motor stator leakage inductance	0.00000	mH
p358[0]	Motor rotor leakage inductance / damping inductance, d axis	0.00000	mH
p360[0]	Motor magnetizing inductance/magn. inductance, d axis saturated	0.00000	mH
p1825	Converter valve threshold voltage	0.6	Vrms
p1828	Compensation valve lockout time phase U	0.00	$\mu$ s
p1829	Compensation valve lockout time phase V	0.00	$\mu$ s
p1830	Compensation valve lockout time phase W	0.00	$\mu$ s

## Start stationary measurement

1. Select control panel.
2. Select assume control priority.
3. Tick the enables box.
4. Select the green I button and the test begins.



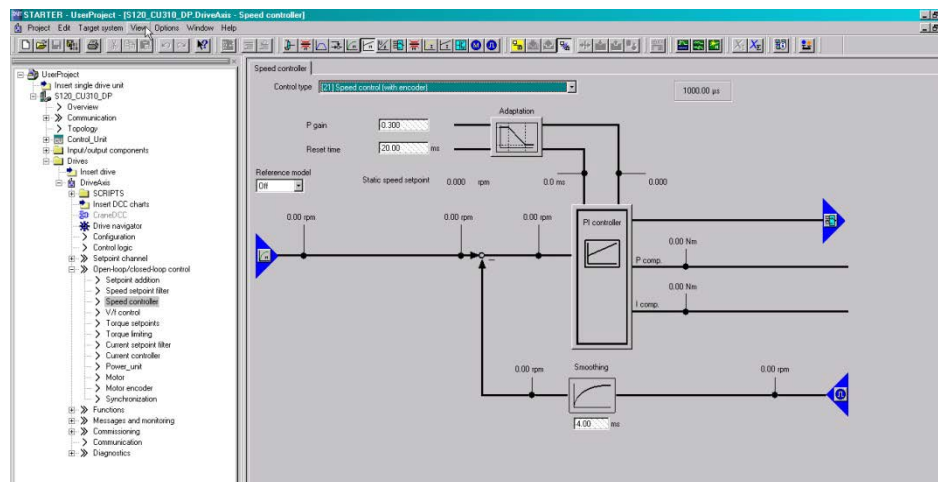
### Step 4 Motor identification



## Purpose of rotating measurement (refer to Chapter 6.3)

- SINAMICS Drive Object
  - Rotating Measurement and Speed Controller Optimization
    - Measurement of magnetization characteristic
    - Measurement of magnetization current
    - Speed controller optimization
    - Acceleration pre-control setting
    - Setting for ratio between the total moment of inertia and that for the motor

### Step 4 Motor identification



## Start turning measurement

1. After stationery measurement select deactivate measurement.
2. Then select next measurement.
  - Repeat steps taken for stationery except select turning measurement with encoder from the drop down menu,

Stationary/turning measurement

Meas. type: 250.00  $\mu$ s

Turning measurement with encoder **Next measurement** ②

The following parameters have to be configured before the measurement:

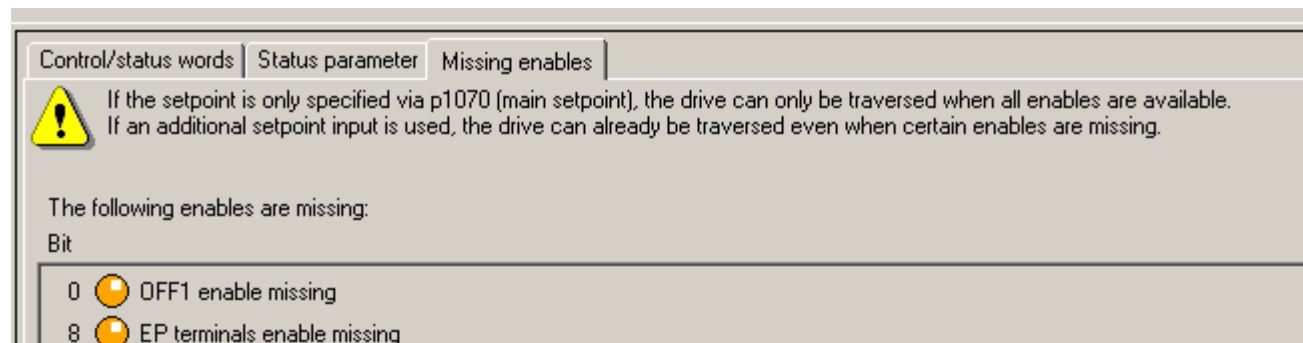
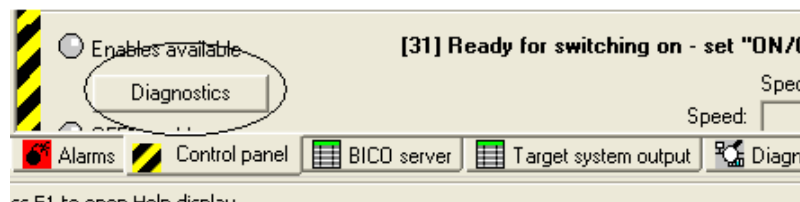
Parameter	+	Parameter text	Value	Unit
p1959[0]	+	Rotating measurement configuration	001fH	
p1961		Saturation characteristic speed to determine	40	%
p1965		Speed_ctrl_opt speed	40	%
p1967		Speed_ctrl_opt dynamic factor	100	%

Status: -- **Activate measurement** ①

### Step 4 Motor identification

## Errors in rotating measurement

- If errors occur in rotating measurement test make sure that all steps have been followed correctly.
- Check drive diagnostics in control panel.

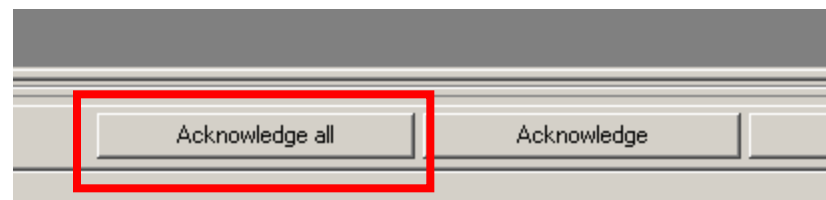
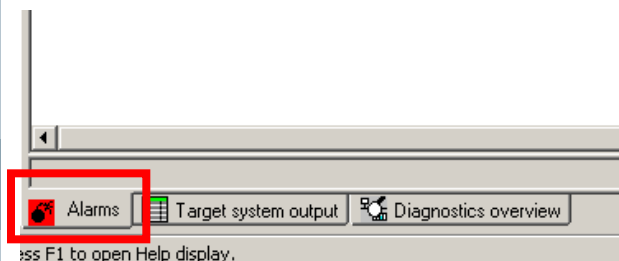


### Step 4 Motor identification

## Errors in rotating measurement

- Use alarm screen and click on error message for help to troubleshoot fault.
- To attempt rotating test again make sure to acknowledge errors in alarms screen.

### Step 4 Motor identification



# Results of the rotating measurement

STARTER - UserProject - [S120\_CU310\_DP.DriveAxis - Stationary/turning measurement]

Project Edit Target system View Options Window Help

Stationary/turning measurement

Meas. type:   
 Turning measurement with encoder   
 Next measurement   
 250.00  $\mu$ s

The following parameters have to be configured before the measurement:

Parameter	+	Parameter text	Value	Unit
p1959[0]	+	Rotating measurement configuration	001.tH	
p1961		Saturation characteristic speed to determine	40	%
p1965		Speed_ctrl_opt speed	40	%
p1967		Speed_ctrl_opt dynamic factor	100	%

Activate measurement

Status: [200] Rotating measurement selected

The following parameters are determined or changed with the motor data identification:

Parameter	Parameter text	Value	Unit
r331[0]	Current motor magnetizing current/short-circuit current	0.000	Arms
p341[0]	Motor moment of inertia	0.000000	kgm <sup>2</sup>
p342[0]	Ratio between the total and motor moment of inertia	1.000	
p360[0]	Motor magnetizing inductance/magn. inductance, d axis saturated	0.000000	mH
p362[0]	Saturation characteristic flux 1	60.0	%
p363[0]	Saturation characteristic flux 2	85.0	%
p364[0]	Saturation characteristic flux 3	115.0	%
p365[0]	Saturation characteristic flux 4	125.0	%
p366[0]	Saturation characteristic I_mag 1	50.0	%
p367[0]	Saturation characteristic I_mag 2	75.0	%

## Step 4 Motor identification



## Alternative to rotating measurement (refer to Chapter 6.3)

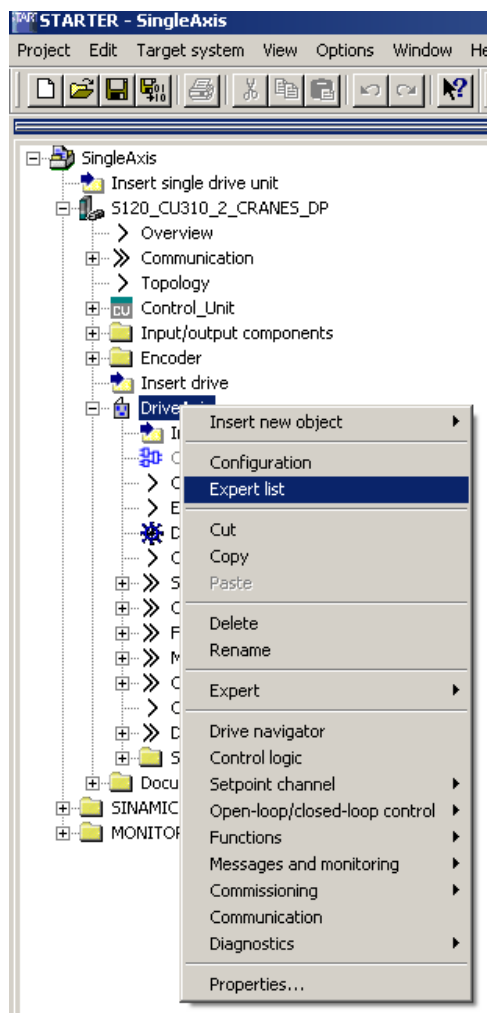
If the rotating measurement cannot be performed, it is possible to correct manually the missed rotating measurement settings:

- To correct manually the magnetizing current and magnetizing inductance
- Speed control optimization by re-calculating the control parameters (p0340) or by optimizing manually the controller

Refer to the manual “SIMOCRANE Drive-Based Technology”,  
Chapter 6.3



## Open the Expert list



Select DriveAxis with the right mouse, a new window will be opened.

Select Expert and Expert list

### Step 5 Parameterization Crane DCC



# DCC Parameters in the Expert list

STARTER - SingleAxis - [S120\_CU310\_2\_CRANES\_DP.DriveAxis - Expert list]

Project Edit Target system View Options Window Help

Enter search text hexadecimal

Expert list

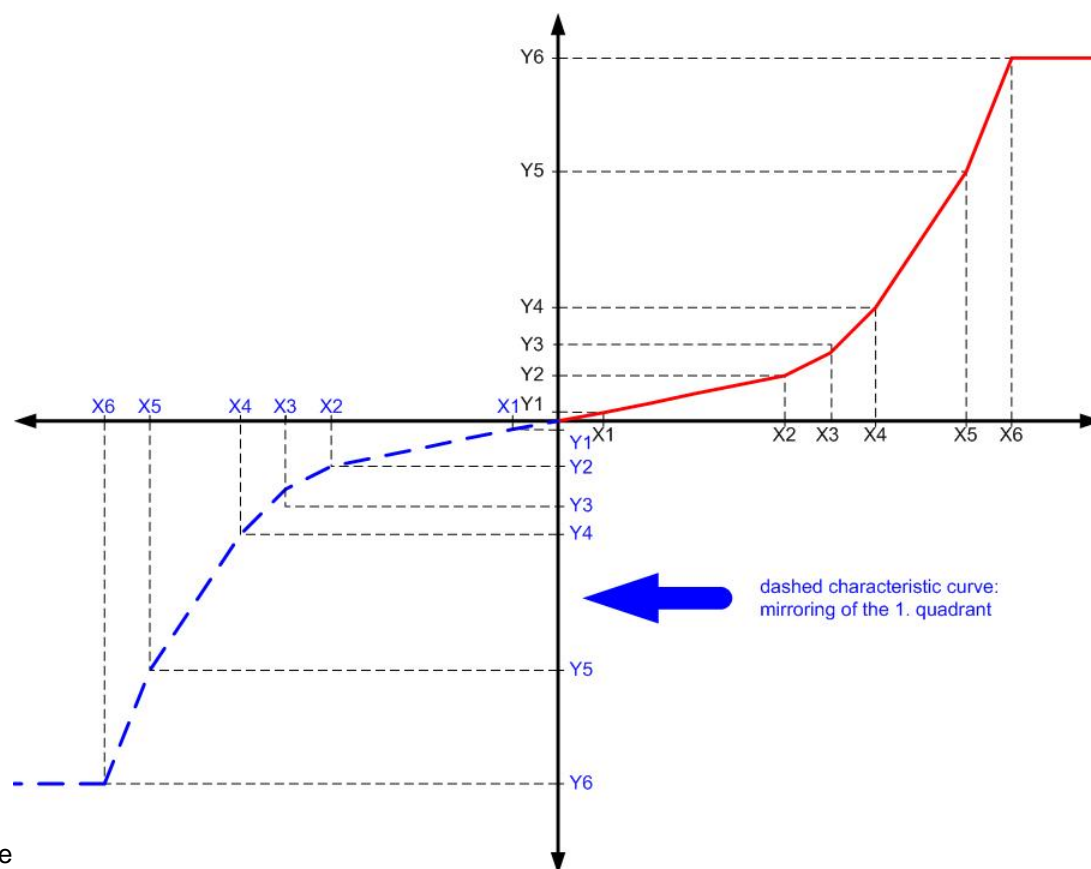
Param...	Data	Parameter text	Offline value DriveAxis
All	All	All	All
1339	r21005[0]	Computing time load of the run-time group, Run-time group 1	0.0
1340	r21008[0]	Hardware sampling times available, Hardware 1	0.250
1341	p22000	MasterSwitch_rInSpeedSetpointMS [%]	Control_Unit : r755[0]
1342	p22001	MasterSwitch_boEnableMasterSwitch	0
1343	p22002	MasterSwitch_boPositiveDeflection	Control_Unit : r722.0
1344	p22003	MasterSwitch_boNegativeDeflection	Control_Unit : r722.1
1345	p22004	MasterSwitch_rX1DeflectionParameter [%]	5.000
1346	p22005	MasterSwitch_rY1SpeedParameter [%]	5.000
1347	p22006	MasterSwitch_rX2DeflectionParameter [%]	10.000
1348	p22007	MasterSwitch_rY2SpeedParameter [%]	10.000
1349	p22008	MasterSwitch_rX3DeflectionParameter [%]	25.000
1350	p22009	MasterSwitch_rY3SpeedParameter [%]	25.000
1351	p22010	MasterSwitch_rX4DeflectionParameter [%]	50.000
1352	p22011	MasterSwitch_rY4SpeedParameter [%]	50.000
1353	p22012	MasterSwitch_rX5DeflectionParameter [%]	75.000
1354	p22013	MasterSwitch_rY5SpeedParameter [%]	75.000
1355	p22014	MasterSwitch_rX6DeflectionParameter [%]	100.000
1356	p22015	MasterSwitch_rY6SpeedParameter [%]	100.000
1357	r22016	MasterSwitch_rOutSpeedSetpointMS [%]	0.000
1358	p22030	OverSpeed_rSpeedSetpoint [%]	DriveAxis : r62
1359	p22031	OverSpeed_rActualSpeed [%]	DriveAxis : r63[0]
1360	p22032	OverSpeed_rRatedSpeed [rpm]	1500.000
1361	p22033	OverSpeed_rReferenceSpeed [rpm]	DriveAxis : r2700
1362	p22034	OverSpeed_rAfterRampGen [%]	DriveAxis : r22159
1363	p22035	OverSpeed_boEnableFieldWeak	DriveAxis : r22158.0
1364	p22036	OverSpeed_boResetLoadCurrent	Control_Unit : r722.19
1365	p22037	OverSpeed_boReset	DriveAxis : r2138.7
1366	p22038	OverSpeed_boEnableSetpointActualMonitoring	Control_Unit : r722.13
1367	p22039	OverSpeed_rOffset [%]	10.000
1368	p22040	OverSpeed_rDelayTime [ms]	250.000
1369	r22041	OverSpeed_boOverspeed	0H
1370	p22050	PreLimitSwitch_rInSpeedSetpointPLS [%]	DriveAxis : r22156
1371	p22051	PreLimitSwitch_boBit1LimitSpeed	Control_Unit : r722.20
1372	p22052	PreLimitSwitch_boBit2LimitSpeed	Control_Unit : r722.21
1373	p22053	PreLimitSwitch_boPreLimitSwitch	Control_Unit : r722.22
1374	p22054	PreLimitSwitch_rLimit1 [%]	100.000



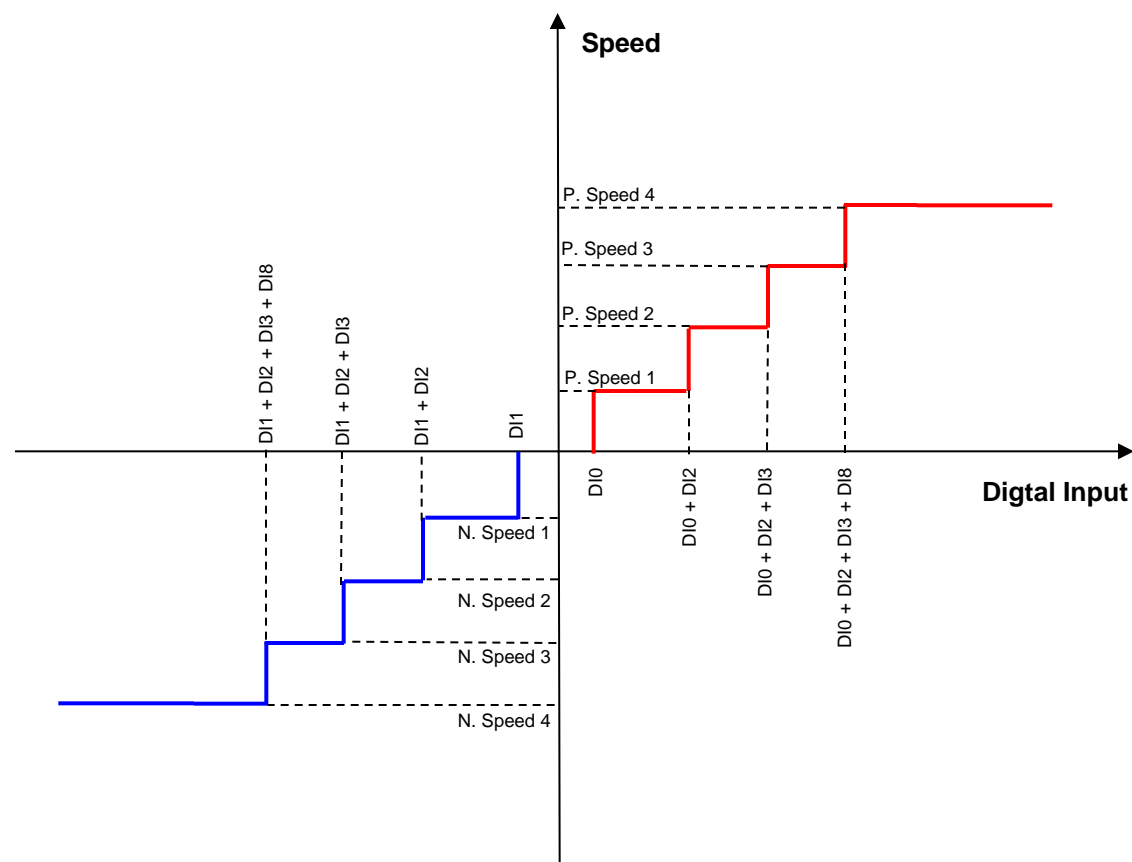


## DCC\_MasterSwitch (refer to Chapter 4.2)

In order that for low deflection angles lower speed setpoints are obtained than those that correspond linearly to the deflection angle, the master switch setpoint is modeled through a non-linear function. This allows the drive to be precisely positioned in the manual mode.



## DCC\_DigitalMasterSwitch (refer to Chapter 7.1.1)

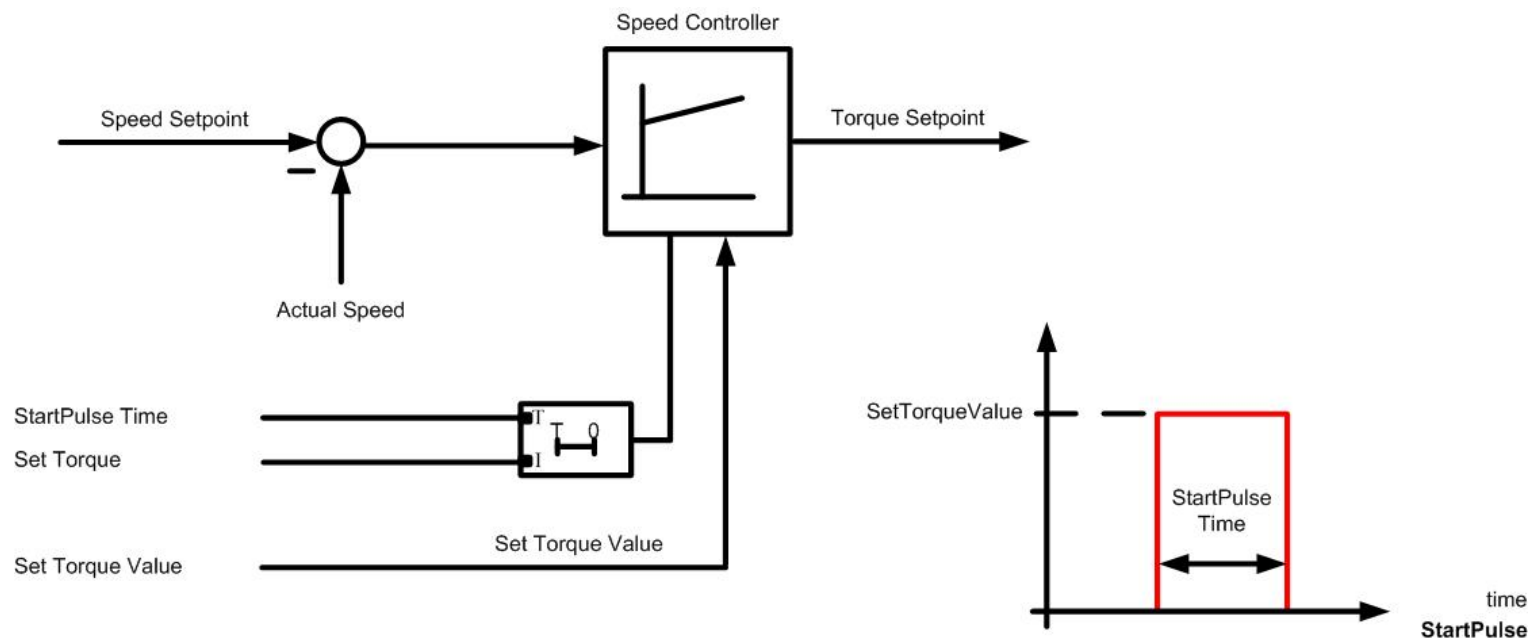




## DCC\_Startpulse (refer to Chapter 4.3)

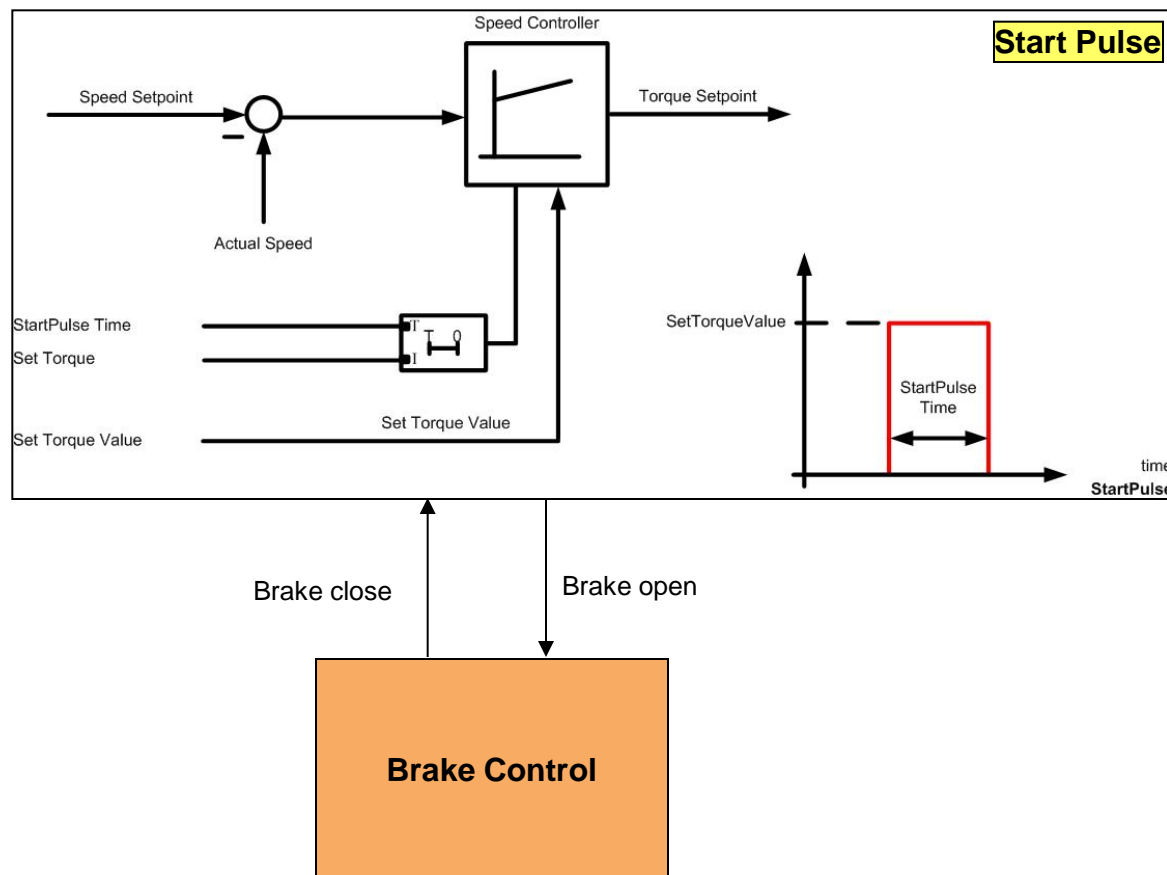
For hoists, when starting (i.e. opening the hoisting gear brake) with freely suspended load, often the load undesirably sags. The reason for this is that the torque is not available when starting.

When starting with a suspended load, the torque must be quickly established.





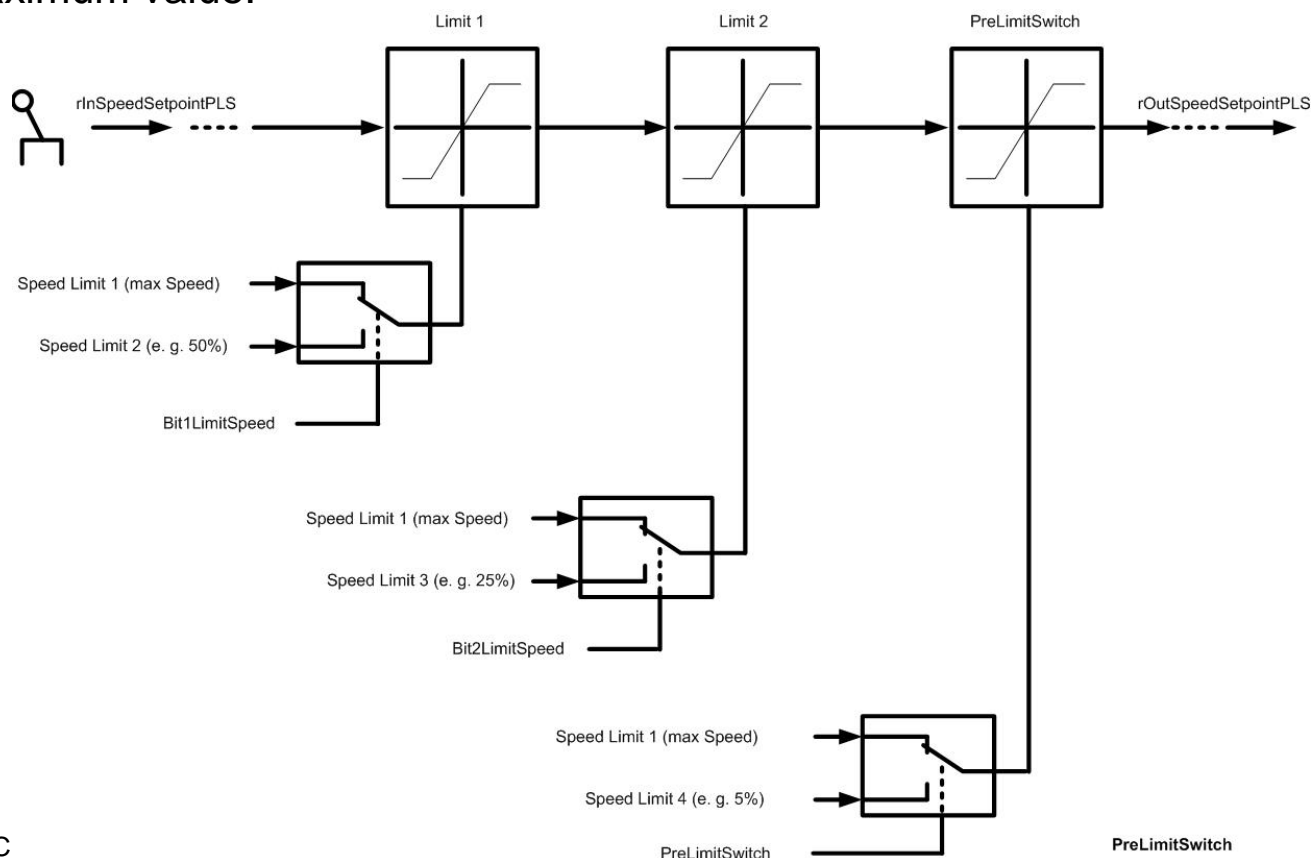
## DCC\_Startpulse in combination of Brake control





## DCC\_PreLimitSwitch (refer to Chapter 4.4)

This function prevents that the drive moves with full speed to the limit switch or to the safety buffer. A total of 4 different speed limits can be configured. Interconnect the maximum speed with speed limit 1. This limits speed to the maximum value.

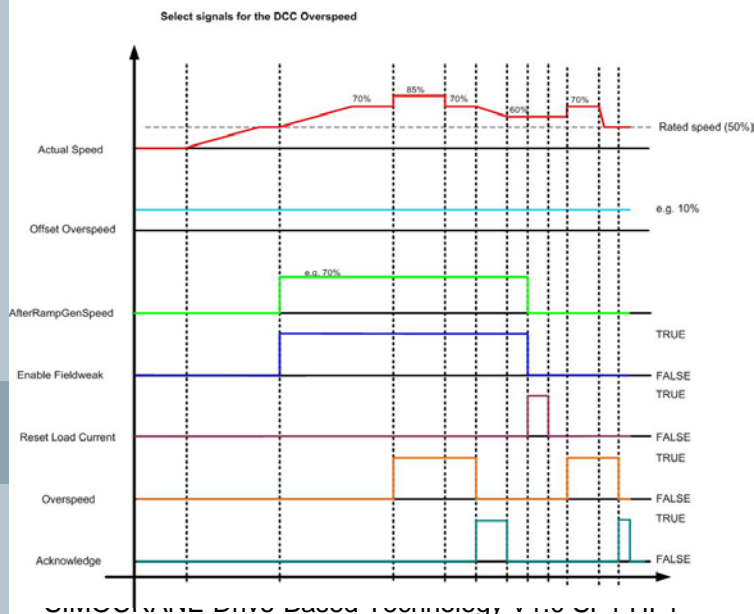




# DCC\_Overspeed (refer Chapter 4.5)

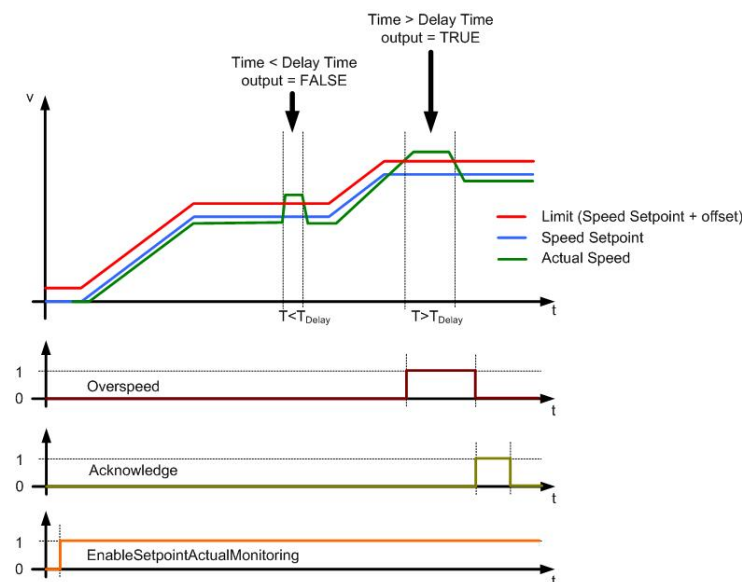
## Function 1

to monitor the actual velocity for an overspeed condition.  
Compared value can be either in range of the rated speed or in field weakening area.



## Function 2

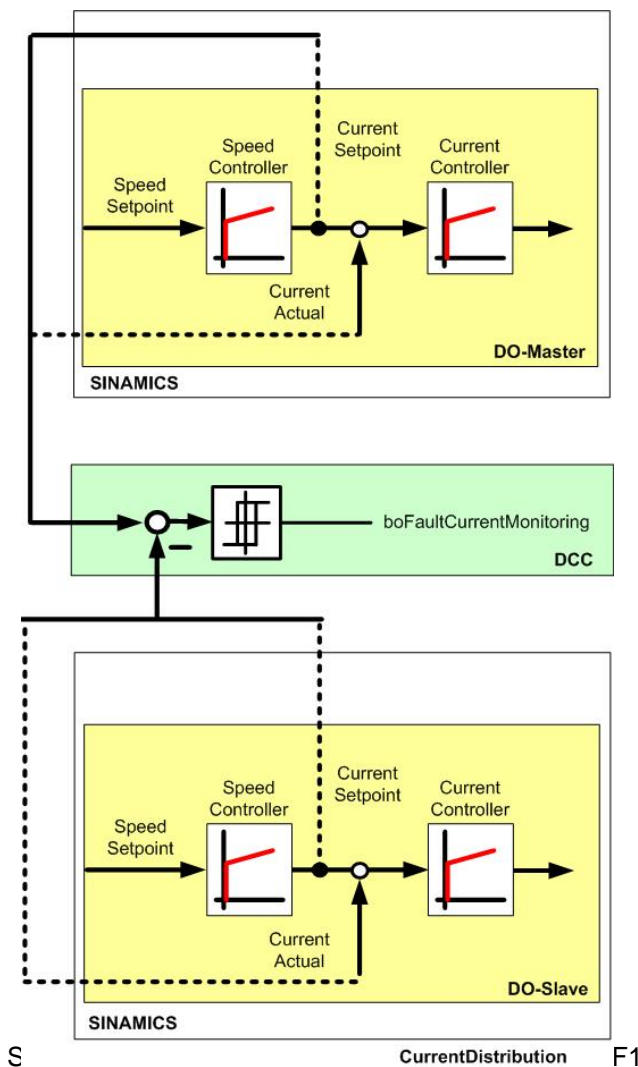
to monitor continuously setpoint-actual value deviation



Industry Sector



## DCC\_CurrentDistributionMon (refer to Chapter 4.6)



This function can be used for master-slave operation or synchronous operation. The block monitors that the total current of both drives is distributed evenly.

In synchronous operation, the current setpoint value is monitored for the two drives. In master-slave operation, the current actual values of two drives are monitored.

If the difference of the setpoint or actual currents of both drives exceeds the configured values for deviation and time, then output r22037 "boFaultCurrentMonitoring" is set.



## DCC\_LoadDependingFieldWeak (refer to Chapter 4.7 and 6.5)

When selecting field weakening, e.g. using the master switch, a supplementary speed setpoint for field weakening, which is permissible for the actual load, is generated.

### Theoretical basics and equations

The steady-state load torque is calculated as follows:

$$MM = M_{Load} + M_{Friction}$$

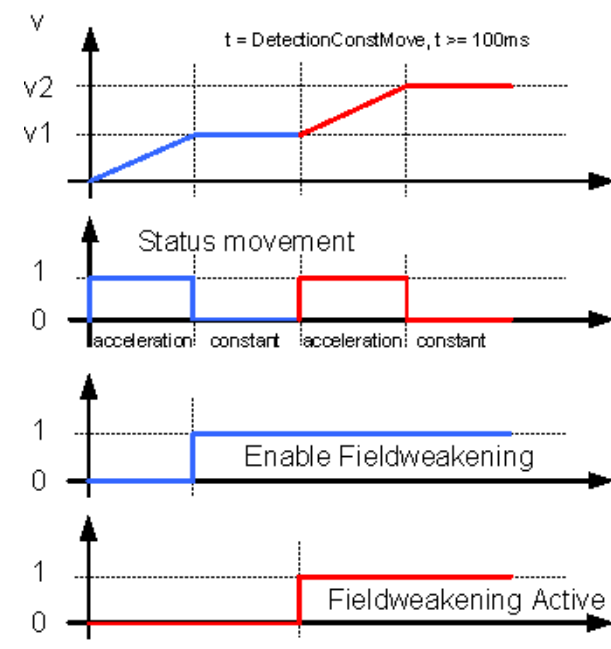
MM: Motor torque

M<sub>Load</sub>: Load torque

M<sub>Friction</sub>: Frictional torque

### Commissioning instructions

1. To generate the measured variables (refer to chapter 6.5.2.1)
2. Compensating the frictional torque (refer to chapter 6.5.2.2)
3. Correcting the efficiency (refer to chapter 6.5.2.3)
4. Calculating the physical size of the load (refer to chapter 6.5.2.4)





## After commissioning save the project

After the Commissioning is finished, following steps must be done:

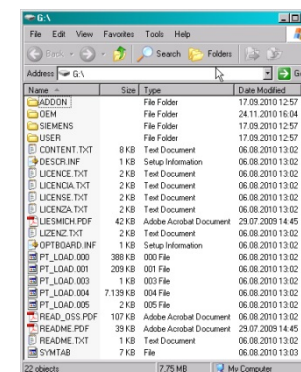
- Copy RAM to ROM (all settings will be saved on CF card)



- If the parameter settings in the CU310 are changed online, then upload the project to PG and save the project in the STARTER.



- Do a copy of the complete CF flash card to the hard-disc as a backup.





# SIMOCRANE Product Support

➤ SIMOCRANE Product-Support (news, FAQs, Manuals,..) in Internet  
<http://support.automation.siemens.com/WW/view/en/10807397/130000>

➤ Crane Application note:  
<http://support.automation.siemens.com/WW/view/de/48342008/136000>

➤ **New:** Support request via Internet (Product → Simocrane) :  
<http://support.automation.siemens.com>

➤ **New:** Hotline EUROPA

- Telefon: +49 (0) 911 895 7 222
- Fax: +49 (0) 911 895 7 223
- Email: [support.automation@siemens.com](mailto:support.automation@siemens.com)

➤ **New:** Hotline AMERICA

- Telefon: +1 423 262 5710
- Fax: +1 423 262 2231
- Email: [support.america.automation@siemens.com](mailto:support.america.automation@siemens.com)

➤ **New:** Hotline ASIA / PACIFIC

- Telefon: +86 10 6475 7575
- Fax: +86 10 6474 7474
- Email: [support.asia.automation@siemens.com](mailto:support.asia.automation@siemens.com)



**SIEMENS**

# **SIMOCRANE Drive-Based Technology V1.0 SP1 HF1**